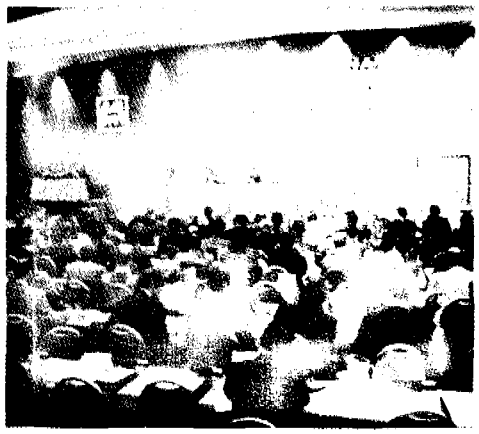
SECTION 3

DISCUSSION: RULEMAKING AND THE EXPERIMENTAL SAFETY VEHICLE PROGRAM

Panel Members

Mr. Douglas W. Toms, *Administrator, National Highway Traffic Safety Administration, United States Department of Transportation*
Mr. John A. Edwards, *Associate Administrator for Research and Development, Research Institute, National Highway Traffic Safety Administration, United States Department of Transportation*
Mr. Robert L. Carter, *Associate Administrator for Motor Vehicle Programs, National Highway Traffic Safety Administration, United States Department of Transportation*
Mr. Albert J. Slechter, *Assistant Director, Office of Experimental Safety Vehicle Programs, National Highway Traffic Safety Administration, United States Department of Transportation*
Mr. Elwood T. Driver, *Director, Office of Operating Systems, Motor Vehicle Programs, National Highway Traffic Safety Administration, United States Department of Transportation*
Mr. James E. Hofferberth, *Chief, Structures Division, Office of Crashworthiness Programs, Motor Vehicle Programs, National Highway Traffic Safety Administration, United States Department of Transportation*

Mr. Ralph T. Millet, *President of the Automobile Importers of America*
Dr. Gunther Brenken, *Executive Director, National Association of Auto Industries, Federal Republic of Germany*
Mr. Peter N. Gerosa, *Head of the Road Safety (Vehicle Standards) Division of the United Kingdom Department of the Environment*



RULE-MAKING AND THE EXPERIMENTAL SAFETY VEHICLE PROGRAM

SECTION 3 PART 1

STATEMENT

MR. RALPH T. MILLET, *President*

Automotive Importers of America

I would like to preface my remarks today with some words of wisdom spoken by Secretary Volpe at the initiation of this conference last Tuesday. He said that a major objective of the ESV program was, and I quote, "to incorporate the safety features demonstrated by the prototype ESV's into requirements for mass production vehicles. I am sure you will all be interested in the session that has been scheduled at this conference to discuss the relationship of the ESV program to the safety standards we are working on for the near future. . . . All of the governments represented here today must begin to study the ways and means by which the work done on ESV's can be translated into production model requirements. We in the Department of Transportation are working on this now, and are prepared to exchange our ideas as to how this can best be accomplished with all of our ESV partners. At the appropriate time, I hope another international meeting can be held on this all-important topic to discuss how we can assure the maximum uniformity, on the international level, of vehicle safety standards."

AIA applauds this recognition by Secretary Volpe that as the ESV development programs proceed, it is becoming more and more obvious that the ESV results are leading to conflicts with the rulemaking actions that have been proposed in the Program Plan for Motor Vehicle Safety Standards. Since the final ESV specifications will be promulgated at the end of the year, the deadline for reconciliation is rapidly approaching.

The manufacturers' dilemma is this. We are expending as Secretary Volpe stated in his opening remarks "tens of thousands of scarce engineering man-hours on the ESV project," the announced purpose of which is to establish new and different regulations. The vague rulemaking proposal in the Program Plan Book also demands these scarce and limited engineering man-hours. In addition, and at the same time, these resources are severely burdened by the requirements of current mushrooming DOT Regulations.

Even worse, rulemaking actions currently proposed and those contained in the Program Plan Book are not awaiting the results of the tremendous research effort being expended in the ESV Program but are proceeding rapidly along a divergent course.

Some of the specific conflicting areas are the requirements regarding injury criteria, energy management, visibility, exterior protection, and accident avoidance.

If this conflict continues, the public will suffer because the design of new, safer vehicles is unquestionably being delayed by uncertainty, diversion, and dilution of the design direction. Should we follow the uncertain Program Plans or should we target assumed results of the ESV Program?

The urgent need for synchronization is wisely signaled by Secretary Volpe's call for an International Conference to resolve the differences between the ESV specifications and rulemaking actions.

In the meantime it is perfectly clear that there should be a moratorium at least on program plan proposals in conflict with ESV findings.

In short, we applaud Secretary Volpe's recognition of these problems confronting manufacturers. We trust that his Department can lead us to a quick resolution of the collision course between the ESV program and the Program Plan Book. Without such a resolution, delay in the building of safer cars for the public will be inevitable.

RESPONSE

Mr. Toms, NHTSA: I am Doug Toms, and I would like to attempt a response to Ralph Millet and his presentation.

First, I would like to point out to all of us here, in particular for those of you who may not be aware

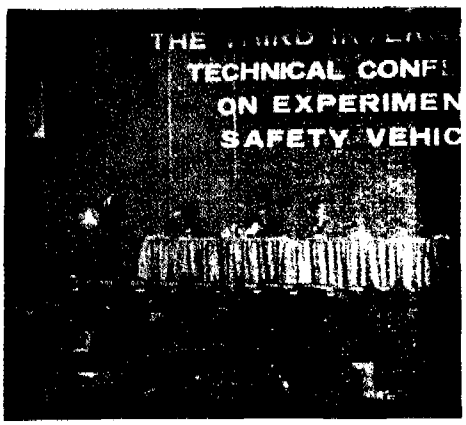
that Ralph does chair a very critical subcommittee on the National Motor Vehicle Safety Advisory Council, and Ralph's position as President of the AIA places him in a spot where he is particularly well informed and well advised. And I might compliment Ralph on the outstanding manner in which he carries out his duties.

I guess the first thing that I would like to say in response to Ralph's request is that I don't know how quickly we can solve these problems. Secondly, I agree with all those who have expressed the need for an international conference. Obviously, we would not have encouraged Secretary Volpe to say that if we did not believe in it. Further, we would not encourage such an international conference if we had all the answers. Clearly, we do not have all the answers. Clearly, much of the technical information that has been presented here at this conference this week is such that it challenges us to keep up with it, to properly assimilate it, and determine ways in which it can be translated into rules.

Ralph, I think that you are truly on-the-money when you lament the large number of engineering man-hours that have gone into ESV programs around the world and, indeed, it would be a shame if they did not get translated into useful programs that would benefit all mankind. So, we recognize that need.

I think the toughest question that Mr. Millet posed to us deals with the conflicts in our Program Plan and the specifications for our ESV. The most honest statement that I can make to all of you is that this is most difficult for us internally in the Department of Transportation. There are many disagreements among our scientists and our engineers as to how we can continue to assist you in your new model development, in your own corporate planning through the issuance of a program plan and how we can adapt this Program Plan to follow the guidance that is becoming evident from the Experimental Safety Vehicle Program.

Ladies and gentlemen, if I had a clear answer that I could give to you, rest assured I would state it. The best thing I can say is that it is very difficult; we recognize the problem, we solicit your suggestions and we will make a sincere effort to remain as open-minded on these issues as we possibly can.



RULE-MAKING AND THE EXPERIMENTAL SAFETY VEHICLE PROGRAM

SECTION 3 PART 2

STATEMENTS AND QUESTIONS POSED

DR. GUNTHER W. BRENKEN, *Executive Director*

National Association of Auto Industries
Federal Republic of Germany

Experimental safety vehicles serve the purpose of establishing procedures to increase active and passive safety. After completion of all testing and an international exchange of information, a further improved cost/benefit analysis must be established and only then may a basic avenue for future standard setting be gained. The state-of-the-art of the ESV development already allows for recognition that only increasingly smaller benefits can be gained in contrast to sharply rising expenditures. It must also be considered that intended measures for environmental protection will have an additional negative effect on costs, and in reference to these costs we must consider the consumer.

At the insistence of the U.S. Government the ESV program has been raised to an international project. In contrast, it should be noted that present legislation in the U.S. was promulgated on an exclusively unilateral basis. The responsible committee in Europe for international motor vehicle legislation is the Working Party 29 of the Economic Commission of Europe (ECE) in Geneva.

Happily it has been noted that the U.S. representatives have lately become more active in the WP 29 and have been involved decisively in the completion of a number of regulations. This development is welcomed by the automobile manufacturers of the ECE member countries.

NHTSA has established a program for the continued development of technical regulations, and the requirements contained therein have often been changed or made more stringent, with the leadtimes being shortened or lengthened. This has created great uncertainty among the automobile manufacturers. By this procedure, additional costs, including the cost of ESV development – providing they were based on production vehicles – which amount up to several hundred million dollars, have been created. An especially sharp increase in the additional costs for production type vehicles will be noted when the leadtime of effective dates of future rule making will be shortened. With more stringent technical requirements longer leadtimes of five to seven years are realistic. This statement can be true only for new vehicle models, since modifications on production models or on vehicles already in operation, generally is out of the question.

It must be determined that the ESV Program stresses the technical aspect of the vehicle too much and neglects the other factors in traffic situations, such as the driver and the road. In addition, an internationally acknowledged anthropomorphic test device for determination of injury criteria is still missing. The cost/benefit analysis of safety measures can lead to results for evaluation only, when each of the three factors – vehicle, driver and road – are fully considered.

We therefore present the following six questions to NHTSA:

1. Does NHTSA think that consideration for setting new legal requirements can be given only after completion of all ESV tests in 1974, and after the intended exchange of information, and a thorough cost/benefit analysis?

2. Does NHTSA Intend to also conduct biomechanical investigations for a uniform determination of injury criteria and test devices?
3. Is NHTSA willing to make available to the competent agencies the knowledge gained from the ESV program for the protection of all people of all nations, as a basis for international, or at least consistent legislation in all countries, and to refrain from exclusively individual efforts in rule-making?
4. May the technical requirements and the effective dates contained in the new NHTSA Program Plan be considered final and binding over a longer time period (until 1980)?
5. Does NHTSA acknowledge that most of the more stringent technical requirements can be achieved only after appropriate long leadtimes and only for new vehicle models?
6. What are NHTSA's intentions in regard to incorporation of the two other factors of highway traffic – the driver and the road – into the evaluation of the ESV results and into the considerations concerning future rule-making?

Answer – Mr. Toms, NHTSA: I will attempt to answer each of your six questions as concisely and as directly as I can. I hope that you will recognize that I may not be able, due to the breadth of some of the questions, to give you complete and thorough answers, but for the sake of time I will do my best.

I would further like to compliment you on very thoughtful questions and obviously very important questions to us all.

I will go through and give you a short answer and then I will go back and elaborate briefly.

My answer to number one would be, yes, in part. In other words, yes in some parts and perhaps no on others. We are aware of the importance of completing the testing and we are taking into consideration cost benefit.

On number two, yes.

On number three, yes, in part.

On number four, that one is both yes and no. Principally, I say yes and no because the Program Plan changes regularly; in other words we try hard to keep abreast of developments.

On number five, yes, but five to seven year lead time would not be accommodated by us under all conditions.

My answer on six is basically yes.

Now I will go back through and try to elaborate a little bit and give my colleagues a chance to add their comments.

Starting with number one, there have been a great many questions about cost – benefit ratios. We had developed cost-benefit studies on most of our major rulemaking actions. I am constantly asked why we do not publicly present these cost-benefit ratios. There has been a considerable technical and scientific argument in the United States about the assumptions that center around cost-benefit relationships. Such things as how much is a life worth. We find very little agreement on what that figure should be. There is considerable disagreement as to the average income of a man during his lifetime in how many of the indirect costs should be considered in such a calculation. We were hopeful that some of these could be resolved before we attempted to make our cost-benefit ratios public. We are not ashamed of them, but we do recognize that a great many people do not agree with them due to these differences on the assumptions.

In regard to completing our testing before we rulemake, I rather view the situation that we rulemake all the time and we test all the time and the two processes must complement one another. I would pause for my colleagues to add comments if they would like.

Mr. Carter, NHTSA: I might just comment on the benefit-cost studies. One of our big problems there is in obtaining accurate cost data from the industry. So we exercise our best judgment and we would like to enlist your support in coming up with actual costs.

Mr. Toms: Yes, you fellows are really not very helpful on that subject.

On number two, yes, we do have a great deal of biomechanical research underway because this is directly in John Edwards' program and I think John would like to comment in detail.

Mr. Edwards: We have currently approximately six projects underway within our own organization; that is in our in-house Safety Systems Laboratories. We have a two year program to develop improved performance requirements for dummies. The current effort is directed toward improvement of the head-neck combination. The work in terms of human tolerance levels in the biomechanics area is being pushed. It is being funded at increasingly higher levels each year and has been a program that is not in need of initiation because it has been underway for some three years, at least four years to date, and the level of effort in this area is going up. Our level of effort for the present year is at about a million dollars. So, I feel that we are actively pursuing the research activity in that area.

Mr. Toms: I think that a word needs to be stated, John, about human testing.

Mr. Edwards: We wish to expand this much further and we have presently been conducting human tests. We are open to any suggestions from the automobile industry worldwide as to how that human testing may be expanded. We would be willing to utilize our military resources for human volunteers to expand that testing in different sites and perhaps under different conditions. I rank as a very high priority a program that would crash regular automobiles with various restraint systems into the barrier and into other cars with human volunteers inside. I think it is very important that we get to such a program as quickly as we possibly can; and within the limits of how you protect people, in other words, you do not wish to hurt people in this testing, how to protect them, how to deal with the liability, and how to instrument humans in these tests, any answers or any suggestions that people would wish to pose would assist us in moving more quickly in this direction. I think that all of you appreciate how enormously difficult human testing is and how precarious that type of testing is. But even in light of the difficulty of it, we count it as very important and one of the necessary steps to establish what the human tolerance levels are in crashes.

Mr. Toms: If there be no challenges to that response, I will proceed with number three.

I think that international rulemaking is enormously desirable and I have said repeatedly in my public statements worldwide that I would do everything in my personal power to cooperate and participate in any kind of international rulemaking. I have had a number of talks with Mr. Pocci on the subject; talked about it this week. Further, I would pledge that any and all ESV data available to us in the government would be made available to any international rulemaking body that were properly recognized.

I added the word "in-part" to my first answer because I realize that there are different needs in different nations, both in terms of geographical terrain, climate, economy, and a host of other variables. Therefore, many countries may not, due to the prosperity of their economy, or their geography, wish to participate in international rulemaking; but within those limits we would be pleased to do everything we can to engage in international rulemaking. I am on record as saying that at any time we adopt a rule and a recognized international body adopts a rule that runs counter to it, and the information is persuasive that we should change, that I will immediately enter into negotiations to try to accommodate those changes.

Now, I say the information is persuasive, I can recognize that sometimes international bodies would rulemake in such a manner that would not be in the public interest of the American motorist. That is possible and with that caveat I would certainly enter into any kind of international rulemaking. Would my colleagues wish to respond further to item three?

John reminds me that a part of your question did deal with national rulemaking and I think the answer to that, John, was in part dealt with in my statement that we would go back and revise, that we would not withhold rulemaking while waiting for international activity. It is my openly expressed feeling that international rulemaking, because of the variable needs of the nations, is very slow and cumbersome. We would not want to withhold safety from our people while waiting for international rulemaking. We will go back and make amendments or modifications to be in conformity with international rules.

Are there any challenges to our answers on item three or a need for further clarification?

On item four, is our Program Plan obligatory? Well, that is a tough one. Yes and no. Certainly, if you want to sell your cars in our country, you have to meet our national standards. By the same token, we recognize that we are not always right, in that we can make mistakes. We recognize that very often, cars may be designed and components developed that would be superior to the rules that we have set for our country. I would urge you that any time you feel that there might be better products available, or better systems available that might be in conflict with our standards, to please communicate with us. One of the very good things about the Safety Act in the United States is that we can respond instantly to changing needs. I am looking at Don Randall, representing members of the Congress here, any time our Congress initiates these things as law, it is difficult to make quick changes; but when administrative discretion is given to the Secretary of Transportation, we can make rapid adjustments. I can assure you that any time the data are persuasive, we would be willing to make these adjustments. So, I don't want to cause you to follow our Program Plan blindly. We encourage your in-puts and, in particular, we would wish that other governments and auto manufacturers in other countries would indicate where their planning might be in disharmony or out of synchronization with the Program Plan so that we may consider ways that we could improve the Program Plan.

Mr. Carter: I think that most of the industry would realize that the Program Plan as we published it is considered to be a planning document. We

constantly have questions from the industry as to what are you thinking about next year? What are you thinking about five years from now? Well, obviously, the further you go out in time, the more flexible or the less certain we would be of the dates in that Program Plan. It is intended to provide you with some insight into our current thinking and the way our programs are being directed and to provide you with an overall plan from which our research program develops.

Mr. Toms: The dias recognizes Mr. Pocci.

Mr. Pocci: I apologize but I must once more speak to point three. I was not able to ask for the floor before. Mr. Chairman, you have spoken of international regulations and the possible influence that the ISO standards could have on national enactments. You know that I have been asked to represent this organization here in the framework of this conference and, therefore, I would like to be allowed to raise – and quite officially raise a question with regard to the Committee 29 ACE one and further annotated and commented by the European committee when it had examined its work in program. The Economic Committee for Europe has recognized that the international initiative that has engendered the new technologies, advanced and sophisticated technologies, that could give safety characteristics of an improved sort to vehicles up to now unknown or unforeseen. One recognizes – one may believe that within a term that is not too far in the future, one will have interesting results of both human and financial resources from certain industries and certain governments. We did not speak here of the organization itself but it is already implied and we speak here that these new improvements will certainly benefit all nations and all industries in all countries, even those that have not participated. Some have not participated because of economic reasons in the scientific research, for such improvements must know neither language, political, social nor economic barriers.

Certainly, this is a difficult task, but I believe that the good and high intentions of the Economic Committee for Europe certainly should entrust this high task to the present conference. Having said this, I would also interject some other words which seem to be somewhat directed against the international corporation but which are very close to what you, yourself, Mr. Chairman, have said. Sometimes, one cannot wait until international regulations have already been enacted to enact national regulations. This is regrettable but at least we achieve certain results. We get certain results. But, at least, it also pushes the interested countries to find solutions. One, sometimes, is too cautious and one is afraid and one finds an excuse in international corporation not to enact national regulations. Furthermore, and while I'm fully in agreement, while such enactments are being applied on the national level, one can find better applications on the international level. What one can recommend, therefore, to the governments, those very governments that for political reasons, sometimes, are forced to enact national regulations, that certain juridical norms are such that one may then rapidly change these in view of new information. I believe that I should point out that this is a draft resolution of the European committee.

Thank you, Mr. Chairman.

Mr. Toms: Thank you, Mr. Pocci and I certainly agree and thank you for those remarks. If there are no other questions on items one, two, three and four, we will address ourselves further to number five.

The Chair recognizes microphone number eight. Professor Fiala from Volkswagen. Are you going to speak English or German?

Professor Fiala: I'll try English. Thank you. I am coming back to the question of the Program Plan. What we would like to know is what is the probability that this notice will become a standard, even in percent. So, we have an idea, for example, that this new vision angles – is very far away and the probability that a standard will follow the notice is – I don't know say 15 percent. There are some other things in the Program Plan, I feel have a probability of 98 percent. So, I think it would be a good thing, if you could state in the Program Plan what the probability is of this becoming a standard. You could give us the probability for every specific point. This would help us to know how sure you are that this specific point is very important or not. Thank you.

Mr. Toms: Professor Fiala raises an excellent point in a very valid criticism of the Program Plan. In way of an explanation, I guess in the early days of rulemaking, we often went out with an ANPRM and solicited information from the automobile industry and got very little back. So, as a result, we probably fell into a circumstance where the Program Plan did not indicate our interest in this proposal in terms of a future rule. In other words, we did not say we are dedicated to this proposition and come heck or high water so many years from now it will become a rule; versus this is a rule that we really do not think has very much merit but we think it important to put it before the industry and the public to find out if there is something that we overlooked. We did not make those differences and I think that is bad that we did not or that we do not.

Whether we can, indeed, come up with a percentage formula, such as you suggest, I don't know. I,

personally, like that approach and think it would be very helpful to you and would help place our efforts in better perspective. But, I would like to defer to my colleague who toils in the vineyards on this problem all the time and get his reaction; and this will be unrehearsed. He and I have not discussed this percentage proposition.

Mr. Carter, NHTSA: Obviously, it would be quite nice if we could attach some percentage or some probability figure to a notice becoming a rule. I would like to expand a little bit on what Doug said.

In the past we have gone out many times with a so-called advance notice and more often than not we got very little response from the industry. Not only that, when we followed that with a notice, many times we got little response from the industry. So we would go ahead and establish an effective date for the rule and then the industry would sort of take the position well, it looks like it's for real; we better check into it. In the process of checking into it, they uncover problems which we all were unaware of until this particular bit of work had been done. Now, to try and avoid that, we are making a very conscious effort of having much more dialogue with the industry prior to the issuance of a notice of proposed rulemaking. We are trying to learn as much as you know about this or what you think about it prior to the issuance of the notice. We are making some progress along these lines. But, again, the industry generally does not respond until sometime after the notice is issued. While we might say, well, this has a 99 percent probability of becoming a rule, it could very well be that we overlooked something that the industry overlooked as well and then we would have to delay or change the requirements as a result of work that was either done or reported after the issuance of the notice.

Mr. Toms: We would be very willing, very pleased, to work hard at the possibility of some kind of a percentage or an indication and will assure you that we will address ourselves to that proposal and attempt to make some public statement on it in the future as to what the merits and demerits of such a plan might be.

In the interim, Professor Fiala, we are always pleased to meet with members of the industry, either individually or in groups, and try to the best of our ability to answer questions of that type.

Professor Fiala: Another question concerning question number one – the cost-benefit. I think it is really very difficult to express the value of a himan life in dollars. But, I think this is not the most important thing because we are not interested so much in the absolute value of cost-benefit but in the relative value of cost-benefit ratio of different safety standards. The one thing we would like to do is to find the right order and do the more important things before we do the not so important things. So, I think you should go ahead and say that these are only relative figures.

Mr. Toms: I agree one hundred percent. I think that we are getting closer to releasing our figures even if you do disagree with the value in terms of dollars. This does give you the chance to look at the priority with a relationship from one to another.

Professor Fiala: If you present these figures, we can discuss with you and there also the question of the precise figures of the costs will come up. Also, I think, this figure must not be very precise because I have the feeling that the cost-benefit ratio of different things is within one of a hundred and we must not discuss ten or twenty percent.

Mr. Toms: One of the reasons that we have been reluctant – some of the early discussions were so emotional and the cautions that you have just mentioned, that they cannot be very exact, were not respected in our early discussions and people nit-picked over very small amounts and caused us to back away. It is my hope that perhaps we can overcome those problems and we can come out shortly with these values.

Mr. Carter: I might expand just a little bit there, Doug. We hope to have the next issue of the Program Plan out about this fall or early winter. There will be some additions to the plan. One section will be an appendix which will give you in detail our method of conducting benefit-cost studies. We will follow that up with the detail study on a few of our rules. We will then ask you for a criticism of our technique and how it can be improved.

Mr. Toms: Are there other questions about our answers? If not, we will attempt to address ourselves to item five which dealt with lead time and our answer is basically yes, but I said that we cannot always wait for a five to a seven year cycle.

It is observed in the government that our domestic manufacturers are generally extending the time period between total model changes and perhaps some of our overseas companies might be shortening the time periods between some of their model changes. But, nevertheless, I think that it would be our opinion that we could not look toward five to seven year intervals and we would not wait that long for implementation of most rules. Now, I will concede, that if we were to rulemake on really substantive issues like chassis or body, that we may give a longer lead time than on something that wasn't quite as difficult to modify. I might relate to a knob

on the instrument panel or something that might relate to tires, perhaps bulbs or lights; things of this order.

Any questions on the answer to question five?

The Chair recognizes Monsieur Clavel on microphone number one.

Monsieur Clavel: Mr. Chairman, Mr. Carter has just announced to us a new addition of the Program Plan for the autumn or the winter of this year. In connection with question five, to which you have so ably replied, I would like to raise the following question. In this new issue of the Program Plan, we should like to see, we the industry, some indications regarding the technological orientation of the contents of each of the standards that you envisage. To further elaborate on the question of lead time, what do you think of the method that may consist of indicating in advance in this Program Plan, in this new issue, not an application date of the standards, but a fixed delay that may be expressed either in months or in years, counted from the time when the requirements have truly been refined and determined?

Mr. Edwards: If I understood the question basically, it was one of instead of putting the effective date for the standard, that you would want I guess you would say, technical justification for the standard and have the date being sometime after that was developed. Was that basically your question?

Monsieur Clavel: Not quite, Mr. Chairman. Of course we would like to see an orientation of the technological contents of this plan, but we fully realize that you cannot give us in advance in this Program Plan a full and precise text of the envisaged standard. If one were to know it in advance, then you could enact and publish it immediately. This wasn't the question. My question deals with the manner in which you would determine the lead time which would be granted to us. Presently, the Program Plan indicates for a certain date each of the standards. For instance, October 1975 as a deadline but we do not know at which moment the technological requirements will be actually determined. That is why I asked what would you think of the method that would consist of indicating in the Program Plan not a deadline date but instead a delay which would be indicated in either months or years which would be counted from that moment when the technological requirements are truly defined.

Mr. Carter: I think the answer to that would relate back to some of Doug's earlier comments. In developing any plan, we believe you have to exercise some judgment factor as to when technology will be developed and will be available. This we have attempted to do in the plan. We think that this is mandatory; otherwise we would experience what we would consider to be undue delays in the implementation of the standard. Now, this does not mean of course, that should our judgment be wrong and the technology not develop as we though it would, that the standard would not be delayed. In other words, we are exercising a judgment factor as to when something can be developed or when the technology will be available. If we are wrong we would extend the effective date of the standard. That again, is one of the purposes of the Program Plan and updating it from time to time as we plan to do this fall or early winter.

Mr. Toms: I think that you point to what will probably be an on-going problem. It will always be in the financial best interests of an automobile producer to delay major modifications as long as possible; and we recognize this. We have to weigh these problems that you have financially against the public interest in terms of more efficient transportation and lives saved.

I think that you are justified in asking that we do a better job in estimating what the lead times should be and what the priorities of various rules might be within a given time period and perhaps try to relate this better to the state of the technology and do a better job of defining what might be involved in such a rule and the incumbent changes and the times that we project. I think that we can say that we will get better at doing that and we would solicit additional questions and comments from you and I can assure you that we appreciate the thoughtfulness of some of these concerns. As you communicate with us we will do a better job of meeting your needs.

If there not be another question on item five, I will talk about item six.

This is perhaps the broadest question of the six that have been posed. In the Department of Transportation, the Federal Highway Administration has the jurisdiction over our roadway system. For those of you who are close to our program, you are aware that just recently three and one-half of our state and community standards were transferred to the Federal Highway Administration. So the National Highway Traffic Safety Administration has very little jurisdiction over the roadway; for that reason, I would prefer not to trespass on my esteemed fellow administrator's ground.

Let us say that we do communicate regularly and in great depth with the Federal Highway Administration. The Highway Administration and other modal units in the Department of Transportation are clearly aware of the great need to improve our highways to make them safer.

We do have the basic rulemaking authority for dealing with the driver and the passengers in an automobile. I have said many times that we spend a great deal more money working on the driver than we spend on the car. I regret very much that I must often take what appears to be a negative position on our programs dealing with the driver. I'll take just a moment to explain why.

There are approximately one hundred fifty to one hundred seventy million people that regularly ride in motor cars in the United States. There are one hundred ten million licensed drivers. I am very reluctant to attempt to spread encouragement among the American public and State and City officials that we can swiftly and efficiently rulemake programs or develop programs that will modify the behavior of these drivers and passengers.

All the scientists that I know and my own personal background in why people behave the way they do behind the wheel, indicates to me that changes in this category come very slowly. For example, we are presently assembling up to sixty professionals on a regular basis to formulate a master driver license program for the United States. I get very enthused about the ideas that they project and the proposals that they make. I can wax for hours on the merits and the values of some of these proposals and then I have to become sober and remember what kind of money it takes to drastically change driver licensing for one hundred ten million people. How much money and time it takes to initiate new educational programs for one hundred ten million people. How difficult and cumbersome it is to get state legislatures, county commissions and city councils to change their rules and their ordinances to effectively deal with people over whom they have jurisdiction.

These things take a long, long time, and I appreciate that it is the driver who guides the car that has the crash. If you could get him to avoid crashes, there are enormous savings. I have dedicated my professional life to dealing with the driver. It has only been in recent years that I have become heavily involved with the automobile. I would like very much to find a way that we could work wonders with the driver.

So, I only state that sometimes I must sound negative on these things because they are so immense and they are so difficult; but this is not to say that we aren't putting massive resources into that program and that we haven't high goals that we will try to achieve. I could show you films and talk to you about driver licensing, traffic law enforcement, alcohol counter-measures, uniform codes and laws, judicial processes, driver education, for many weeks on end non-stop; all of which are crash avoidance programs that deal with the driver. It would be my hope that your countries would be working on these programs also and that we could exchange ideas and, indeed, the CCMS, NATO programs are heavily involved in these programs.

Dr. Montabone, Fiat: I am leaving Washington convinced that if we don't find a solution to the cost problems, the present specifications of the car, unless they are slightly modified, cannot be applied to any type of car, either weight specification or size specification. But, I am also convinced as I leave, that as far as the ESV vehicles are concerned, there is a big vacuum. Something missing. In other words, the specifications for the ESV does not take into account the fact that cars not only run against walls but they also run against each other. I am also convinced, gentlemen, that it is quite difficult to take into account all of these factors between now and September. In other words, when September comes around, are we going to have a specification which is valid for the whole world?

If my president asked me to put forward a proposal by that date, I would refuse to do it; unless, and then we should state so clearly, unless we are going to think about making a standard car for the U.S. and a standard single car for Europe.

Mr. Edwards: I would reply to that to this extent. I would remind the delegates and Dr. Montabone, that from the first meeting that we had in Paris, we recognized the importance and the significance of the car-to-car collision problem. We do not pretend that we will have the ultimate solution by the end of September, but we think that we will take a significant step forward in the optimization of our specifications based upon the experience that we together have achieved over the last two-year period.

I would hope that those specifications would not be interpreted as the final solution; but by the same token, if we don't take this step, if we don't progressively improve the product, I believe we are placed in the posture of studying the problem perhaps to a point where the problem simply does not get an effective solution attached to it ultimately. So our concept then is to take the next step. It is a modification, a Mark I or Mark II vehicle. Perhaps the other cars that are being developed will take advantage of this work, your work, and input to us as much as is possible. But, as I recall my own words in Paris, the process is iterative and it must go on, least it stop altogether. So I think that is the impetus that is driving us in this case.

RULE-MAKING AND THE EXPERIMENTAL SAFETY VEHICLE PROGRAM

SECTION 3 PART 3

STATEMENT

MR. N. GEROSA, *Assistant Secretary,*

Road Safety Vehicles Division

Department of Environment

The motor vehicle has been the subject of rule-making, or regulation as we generally call it in the United Kingdom since the end of the last century. Until the last few years regulations relating to the construction of vehicles have consolidated existing good practice rather than acted as spurs to new advances. Lately, however, the tendency has developed to use vehicle regulation in two new ways: to set standards requiring features or performances which are known to be technically achievable, but which have not yet come into general application; and to act as a means of international standardization of vehicle construction requirements. Today I wish to discuss briefly the way in which vehicle regulations in the United Kingdom are likely to be affected by the Experimental Safety Vehicle programs about which we have been hearing during the course of this Conference.

One of the basic features of the development in the United Kingdom of the use of regulations to attain new levels of vehicle safety is the principle of ascertaining the technical feasibility of a standard before embodying it in a regulation. To set a standard which cannot in the current state-of-the-art be satisfactorily complied with is to run the risk of having to concede a subsequent extension of lead times, or modification of the standard, with consequent loss of credibility in the legislative system.

The present ESV project, with its associated programs in the participating countries representing all the major vehicle manufacturing nations, will result in a wealth of new information on what is technically feasible. Whether the programs consist of the development of complete safety vehicles to meet a comprehensive set of specifications or of systems and features incorporated in current production vehicles, whether they produce developments and improvements of existing safety devices or fundamentally new ideas, they will all add, and add very significantly, to our knowledge of what levels of safety performance it is possible to achieve, and by what means. This is of fundamental relevance to the future of vehicle regulation.

Another point to which we attach importance is that regulations should not be drafted so as to inhibit further development and innovation by industry. For this reason we are looking increasingly towards performance-based standards, which in effect tell manufacturers how the vehicle should behave or how its occupants should fare in a prescribed set of circumstances, rather than what specific features must be incorporated to give the desired result. The information flowing from the ESV programs will also be very relevant to this approach, and we shall find ourselves in a much better position to prepare new standards based on knowledge of what is technically feasible and expressed to a large extent in performance-based terms.

That is of course not the whole story. It is not all that is needed to justify the imposition of a new set of regulatory requirements. Modern living is increasingly subject to restrictions of one kind and another and it is always necessary to consider very carefully

the justification for proposing to add yet more to the corpus of legislative conditions by which we are bound.

It is perhaps not uncommon to envisage vehicle regulations as a process by which unwilling manufacturers are compelled to spend money to insure that their products afford consumers the degree of safety and protection which society considers its due. But that is not a true picture. Manufacturers will provide the degree of safety that the law demands granted that it is feasible. They would and indeed do provide a considerable degree of safety without any legal compulsion at all. But they do not pay for it. It is the motorist who pays. And before multiplying regulatory requirements it is incumbent on administrations to consider very carefully whether the burden they would place on the motorist, as well as on the manufacturer, is justified by commensurate benefits.

Vehicle regulation is only one prong of the attack on the problem of road deaths and injuries. There is the equally important question of safety in road design, lay-out and maintenance and in traffic regulation and control systems, and there is the fundamental problem, overshadowing all else, of driver behavior. Vehicle regulation manifestly is not capable on its own of providing the complete answer.

The motor vehicle is a boon as well as a bane. We must beware of adding so much to its cost -- and here we need to take a sideways look at the increasingly strict environmental requirements on pollution and noise also – that it is put out of the reach of many of the people to whom it has meant much widening of their horizons.

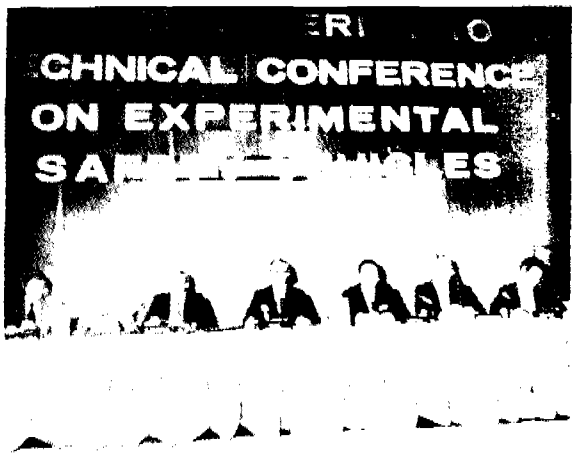
This is not to deny the prospect of significant development in the vehicle regulation field. But it does mean that a very close study is needed of the benefits to be expected from a potential new requirement. It may superficially seem callous to attempt to apply the processes of cost-benefit analysis to measures affecting human life and health. And it is certainly fraught with difficulties. But the attempt must be made, both in order to establish the relative merits of a number of possible safety measures, and their effects on each other's effectiveness, and also to assist in determining (it is by no means the only element in the decision) the point beyond which compulsion no longer becomes acceptable. The accident and injury-saving potential of any measure under consideration, its probable cost and the likely reliability, durability and serviceability of the means of complying with it, must all be carefully examined.

Of course a number of assumptions have to be made, and it is an important function of a vehicle regulation authority to follow up by detailed accident analysis the effects in practice of a new measure to see how far they bear out the forecasts on which the decision to impose it was taken, and whether it needs to be extended or modified or even withdrawn. There is a need for stability because of the long-term time-scale of vehicle design changes, but this must not rule out a willingness to modify the system if evidence of need is produced.

It may at this point be worth mentioning again one assumption of a rather different order that is being made in the development of British safety standards. That is the assumption that the occupants of vehicles equipped with safety belts – all our new cars have had to be for several years now -- will in fact wear them. We know of course that many do not. We have used massive advertising techniques and have succeeded, temporarily at least, in doubling the rate of wearing, but even so to only a little over 30%. The question of compulsory wearing is still wide open and remains to be decided by my government. So does the possibility of requiring features that make it difficult to avoid wearing the belt. But such devices are not absolutely foolproof – a word most advisedly used in this context – and we have concluded that to impose on everyone who buys a new car the cost of assuring an equal degree of protection to those who wear the belts that are provided and to those who don't would be unjustified. It is in this sense, therefore, that while we certainly intend that our standards should afford some protection to unrestrained occupants, they will be based primarily on the assumption that the belts that have to be fitted are in fact worn.

I turn now to the aspect of international standardization. This is a subject that is absorbing an

increasing amount of attention and effort currently in Europe. A high proportion of most manufacturers' production is exported and correspondingly a significant part of every country's demand for motor vehicles is imported. Divergences in national regulatory requirements are a serious obstacle to this very important element in international trade and the impetus to standardization is strong. This is a matter of growing significance to Britain as a prospective member of the European Economic Community, which is developing a system of harmonized vehicle safety standards, observance of which guarantees acceptance of a vehicle throughout all the member States.



It might be feared that this would be a development that ran counter to the interests of vehicle safety; that the tendency would be to settle on the lowest common factor of national safety requirements as the basis on which international trade ought to proceed, and that production for manufacturers' home markets would necessarily follow suit. But that is not in fact the case. The officials who get together in international efforts to harmonize vehicle standards, and the Ministries from which they come, are those who also have responsibility for the promotion of vehicle safety. Their efforts have resulted and will continue to result in standards that pay full regard to safety needs. Differences of view will of course arise from time to time and progress may inevitably be somewhat slower than would be that of an individual government not bound by any considerations of international trade. But this is a dimension of the motor vehicle regulation problem that must be faced up to and cannot be wished away. When successfully met it can bring about a situation in which good safety performance can be more efficiently achieved in production vehicles through the economies of standardized production for a larger market.

Cooperation in Europe is close both in the field of regulation and of research. And there is no doubt that the cooperative ESV project will furnish the basis for a significant development in vehicle safety standards. In translating this basic material into effective regulation my Government's policy will be to urge the adoption of practical, technically achievable standards, conceived so far as possible in performance terms leaving manufacturers freedom to develop new means of satisfying them, and assuring the motorist of good value for the additional money he will have to spend, in effective and reliable improvements in safety and protection.

RESPONSE BY THE PANEL AND THE DELEGATIONS

Mr. Toms: Thank you, Mr. Gerosa, are there any further questions or comments associated with this particular session?

Monsieur Clavel, Citroen: Mr. Chairman, just a short time ago when we spoke of the optimization of the ESV program, which you have envisaged, you have been rather severe as far as I am concerned in regards to head-on collision which you said would be maintained at fifty miles per hour against fixed barrier. It would seem possible, and if not probable, that for small cars or small mini-cars in Europe, this level cannot be actually realized if one wishes to preserve an acceptable survival space, and at the same time also realize an aggressiveness index of four. These two things can quite possibly not be realizable and cannot be justified at an impact at fifty miles against a fixed barrier. In this situation, would you or could you tell us if you would be ready to requalify this problem and to also consider the impossibility of actually reconciling these two facts when you take into consideration the tests which you have seen in the past three days? This would be a qualitative reevaluation of the small vehicle such as the non-aggressiveness, the small size, the easy maneuverability, the lack of pollution or the reduced pollution by small vehicles. Could you tell us whether you could possibly alter your position as regards a mathematically very fixed threshold value when you consider these other facts that are incorporated in the category of cars?

Mr. Slechter, NHTSA: Monsieur Clavel, in my remarks today, I hope I more than hinted at the possibility of a potential decrease in a fifty mile per hour barrier crashworthiness; given that the necessary data to support a decision like that is available. We've

seen in the last three days the potential feasibility of fifty mile per hour barrier crashworthiness and we've also been exposed more and more to this problem of aggressiveness. This conference brought it, I believe, to a head. My remarks indicated that I would like very much, as far as ESV is concerned and its specification discussion this summer, to speak with you and get your comments about what you feel are the practical limitations associated with that trade-off of crashworthiness at barrier speeds of fifty mile per hour and aggressiveness. There is a cost effectiveness argument, again, as we all know. I think we are all, at this table here, looking for a solution that optimizes the losses in the traffic system. Probably the most significant trade-off to be made, the most important one and the most difficult one, is crashworthiness versus aggressiveness. I think the data that was shown here yesterday by a number of representatives certainly bears out the importance of the front-end in the car's design; both in fixed object crashes and in car-to-car crashes.

Mr. Toms: I might add, Monsieur Clavel, that we are presently very carefully evaluating the use of small cars in our country as commuter cars and we certainly recognized the problems of aggressivity; the little car impacting a very large car. I think that many of us hold beliefs that if regulation in the long run becomes necessary, that we give some thought as to what the maximum size of a car could be. We do further recognize that there are limits in the quantities of fossil fuels and there are limits on this earth in the amount of ore and that we cannot continue to be a consumption society forever. Significant savings in natural resources can be gained by reducing the amount of fuel consumed and the amount of steel and other ores consumed in the production of vehicles. All of these things are being actively considered in the government today.

Mr. Boschetti: My name is Boschetti from Peugeot. In this conference, numerous documents have shown development of bumpers with energy absorption devices as a first element of contact and as an axis of the impact, particularly in the lateral impact. A bumper that is too high is an element of aggressiveness. Under these conditions, the American government and the institutions in the United States are still insisting on pendulum tests of up to twenty inches which, therefore would entail more dangerous lateral impacts? Would it not be more reasonable to have pendulum intacts with seventeen or eighteen inches of height? I believe that a draft proposition of ISO is now presently submitted and I think that this evolution could then lead to lower bumpers.

Mr. Hofferberth, NHTSA: Yes, our standards do require pendulum impacts with the center of the face at twenty inches. However, I hasten to point out that the pendulum now is a rather broad-faced configuration and it is not absolutely necessary that the bumper be at the twenty inch height to provide good pendulum contact.

Now, beyond that, in this country it is necessary to maintain a certain minimum bumper height to provide acceptable ramp clearance and acceptable operational characteristics of our cars as they currently exist. That restriction, combined with the requirement to have an adequate width to assure a good interface between cars, dictates that we test between sixteen and twenty inches. I point out that the midpoint of that range is eighteen inches, which is only about a quarter of an inch away from the ISO nominal height for bumper testing, if I am correct on that. So it is correct. We do require testing up to twenty inches.

Mr. Toms: We are very much aware of the desirability of bumpers that would contact the sill of an automobile in a lateral crash. We are painfully aware of the trade-offs that were required to get ramp angle, to deal effectively with pedestrian strikes, and the many other considerations that went into the selection of bumper height. I guess it is a fair statement that the height that was selected and the means of utilizing a pendulum was the best blend of all these compromises. We recognize that in accepting this compromise we have had to give up a bit in many categories.

SECTION 4

CONCLUDING REMARKS

Mr. Douglas W. Toms, *Administrator, National Highway Traffic Safety Administration, United States Department of Transportation*

Mr. John A. Edwards, *Associate Administrator for Research and Development Research Institute, National Highway Traffic Safety Administration, United States Department of Transportation*

CONCLUDING REMARKS

SECTION 4

MR. DOUGLAS W. TOMS, *Administrator*

National Highway Traffic Safety Administration
United States Department of Transportation

Gentlemen, it is my pleasure at this point to make a few brief remarks. First, I want to issue to you, one and all, a sincere and heartfelt apology from me personally that I could not be present at each of your sessions during this conference.

As I indicated on the first day, I was the chairman of another conference that was being held at the Sheraton Park and I was heavily involved in a third conference where I had speaking and head table duties. Also, as many of you may not be aware, the Secretary and many of the officials of the DOT, entertained and met with over sixty ministers of transport this week. All of these duties and the many agreements that had to be signed required that I be away from your meeting for sizeable blocks of time. This I regret very much and I know I speak for Secretary Volpe and Under Secretary Beggs and many of the others of us in the DOT who would very much have liked to be with you throughout the week.

I guess it is one of the sad parts of having an ESV conference during the week of Transpo that there are so many different duties and other obligations which prevented us from attending this most important conference in the manner which we would like.

So, my humble apologies; we are very sorry. We would rather have been with you but there were other duties that we did have to perform.

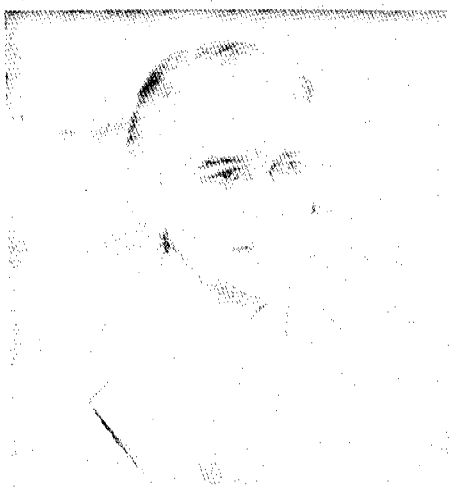
Secondly, during the periods that I have been here, I don't think that I have ever been more impressed with the quality of the presentations. Nor have I ever been more impressed with the fine quality of the technical information that was presented. There was a lot of depth to the presentations at this conference and I compliment you one and all for an outstanding performance.

Third, I think that there were a number of questions raised at this conference many of which were presented in the questions here this afternoon. Clearly, there is a need for more interchange, for more dialogue, for more communication between the governments and between individual governments and the respective auto producers. I think that we must have some kind of an international conference where we can move toward more uniformity of auto regulations on a world-wide basis.

I think that we badly need some kind of a device or a mechanism where we in the United States can spend more time dealing directly with auto producers in other nations. We would solicit, again, your suggestions as to how we could best do this. Nothing would please me more than to spend a week or more on a regular basis at each of your factories. I would find this personally enjoyable but our Congress and my immediate superiors in the DOT, I am sure, would not permit me that much time. However, this does not mean that there are not ways that we can communicate better or that our colleagues in the government could spend more time at your factories or that we could get together more consistently with other governments to try to solve some of these problems.

I think that this conference here this week, the high level of attendance, all of you here patiently paying attention, hour in and hour out, the representation of many presidents, vice presidents, chief engineers, indicates that truly the world is concerned about automotive safety. I again compliment you for the dedication, the money, the resources, that you have put into the problems that are facing us in automobile safety. I think that you all are to be congratulated for your efforts. I am very gratified by the amount of information that is available to us today, world-wide, in the field of automotive safety that was not present two years ago. So, indeed, a great deal of progress has been made.

I am enormously gratified, I am so very pleased that you all did come and that you are here and that the evidence of your efforts, since the last conference, indicates a superlative effort. My hearty congratulations, I look forward to the next ESV Conference, and dedicate all of us in the United States government to do everything that we can to make your burden easier and yet to help us save more lives on the highway.



MR. JOHN A. EDWARDS *Chairman*

Associate Administrator for Research and Development
National Highway Traffic Safety Administration
United States Department of Transportation

Certainly the level of technical exactness being reported has steadily increased over the course of the three conferences that many of us have had the opportunity to attend. Witness how the conference reports, themselves, are getting bigger and bigger, and of course more important; how they are being used by our engineers and technologists. Certainly, international cooperation has clearly been aided and abetted by these conferences.

It has been a very personal and very meaningful professional experience for me to have served as your conference chairman for these three international conferences. I thank you very much and I declare this ESV meeting closed.

UNITED STATES
INTERNATIONAL
TRANSPORTATION
EXPOSITION

transpo 72

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MAY 27-JUNE 4

special section

EXPERIMENTAL SAFETY VEHICLES AT TRANSPO '72

The United States International Transportation Exposition, "TRANSPO '72," was the largest industrial exposition of its kind ever held, and the first entire exposition sponsored by the United States Government. Under an Executive Order signed by President Nixon on June 29, 1970, the Secretary of Transportation, John A. Volpe, was in charge of organizing and directing Transpo '72 which dealt with all modes of transportation. A total of 173,000 sq. ft. of indoor and 586,000 sq. ft. of outdoor space was used by over 600 exhibitors from 12 countries in displaying transportation products and services of the future.

In conjunction with the exhibits a total of 21 technical conferences and meetings were conducted with an aggregate registration of approximately 4,000. The Third International Technical Conference on Experimental Safety Vehicles was one of the conferences held during Transpo '72.

A major attraction at Transpo '72 was a consolidated International Experimental Safety Vehicle Exhibit at which twelve different experimental safety vehicles (ESV's) produced by domestic and foreign firms were on display. The exhibit provided the approximately 1 million visitors from all over the world a striking glimpse into the future of safer driving and vehicle safety.

The ESV prototypes, now and for some time to come, will be "idea" cars, although it is expected that many of their safety innovations will soon find their way into the production line.

The search for a "safe" automobile was spearheaded by the U.S. which seeks development of a 4,000 pound class "family sedan" type of ESV. Working at the international level, the U.S. is emphasizing three major goals:

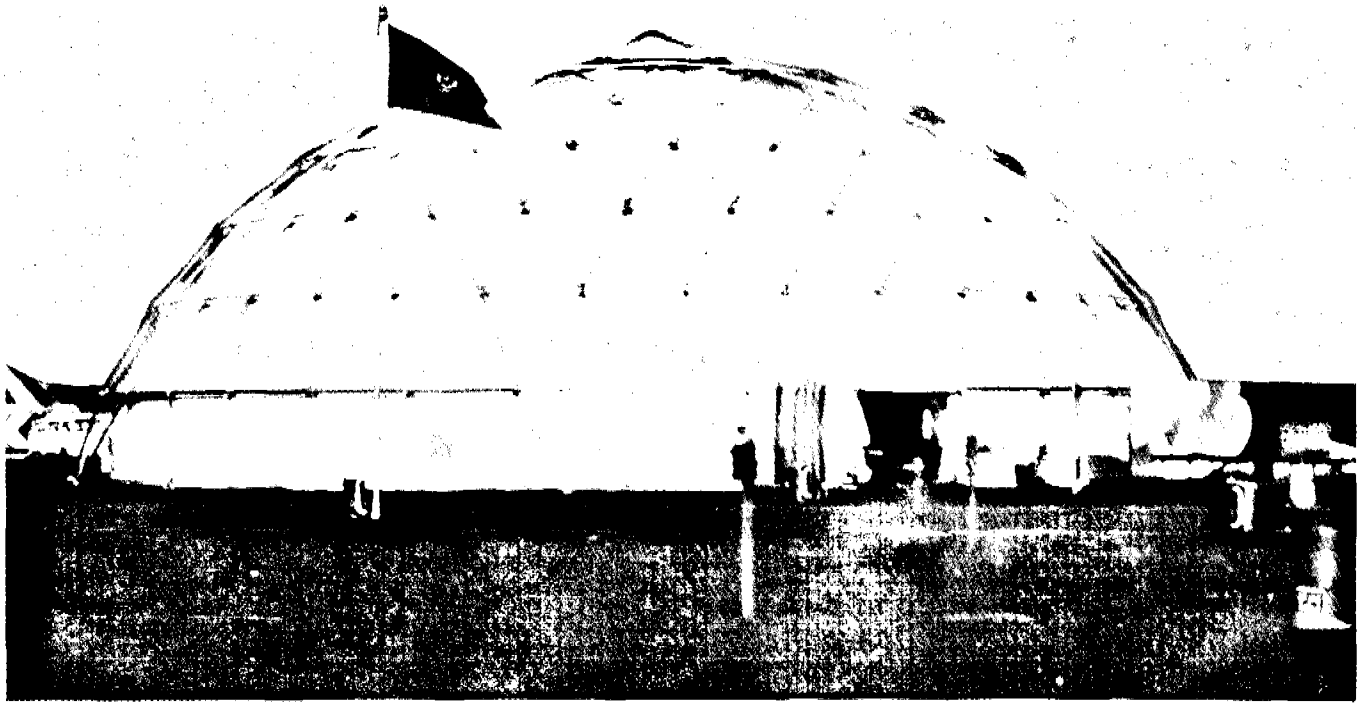
- Development of new vehicle safety technology.
- Full cooperation among all participants in sharing new technology as it develops.
- Incorporation of prototype safety feature standards for mass production vehicles that reflect worldwide needs and research experience.

The development of experimental safety vehicles is designed to produce a "quantum jump" over the customary year-by-year, step-by-step evolution in the auto industry.

The special display of experimental safety vehicles was sponsored by the U.S. Department of Transportation's National Highway Traffic Safety Administration. Shown below is the exhibit dome, which was 120 feet in diameter and 49 feet high with 10,000 square feet of floor space. In addition to the ESV's the dome contained an NHTSA exhibit showing visitors how they could help from becoming a crash statistic. It featured information on drunk driving counter-measures, vehicle safety standards and driver performance being encouraged by the 50 U.S. States under the Highway Safety Act of 1966.

Representing the Federal Republic of Germany were the ESV's of Mercedes-Benz and Volkswagen. The United Kingdom displayed its MG and Triumph, with components of ESV equipment developed by British industry and installed in the two cars. Italy was represented by the Fiat ESV, and Sweden by the Volvo Experimental Safety Car. Toyota and Datsun, represented Japan in that country's ESV efforts. The United States showed off its entries with the AMF, Fairchild-Hiller, Ford, and General Motors ESV's. The Japanese, British, Swedish, German, and Italian vehicles were shown in the U.S. for the first time.

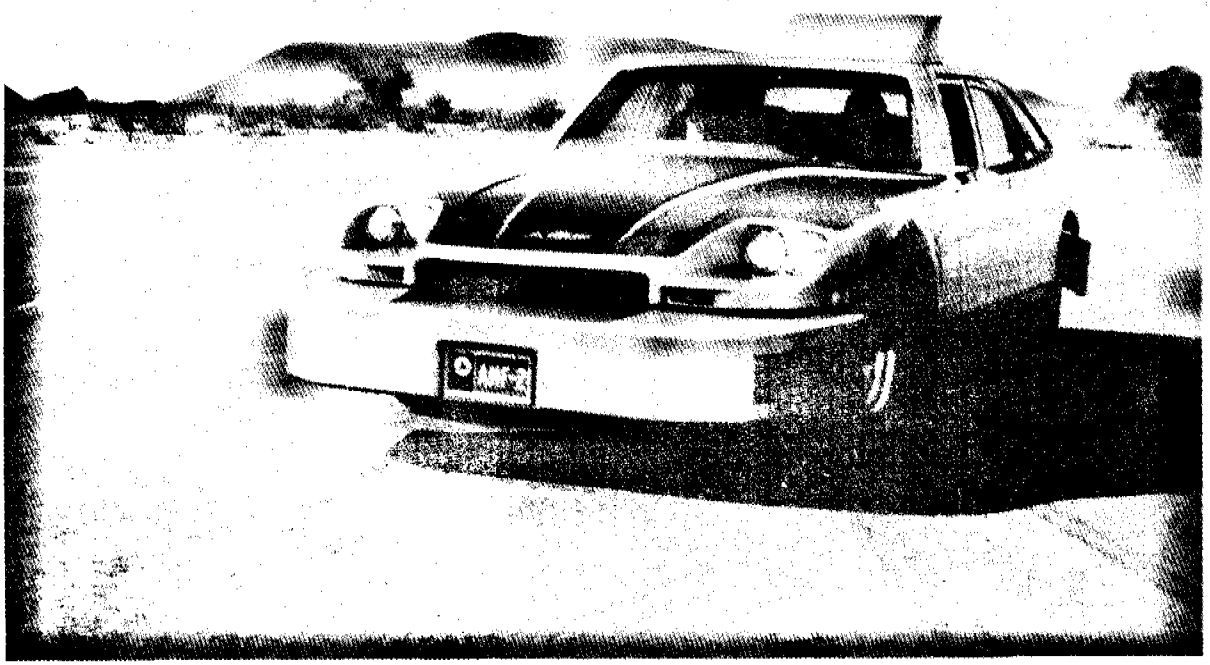
Details on ESV innovations, along with photographs of each car are given on the following pages.



AMF

The United States

AMF EXPERIMENTAL SAFETY VEHICLE



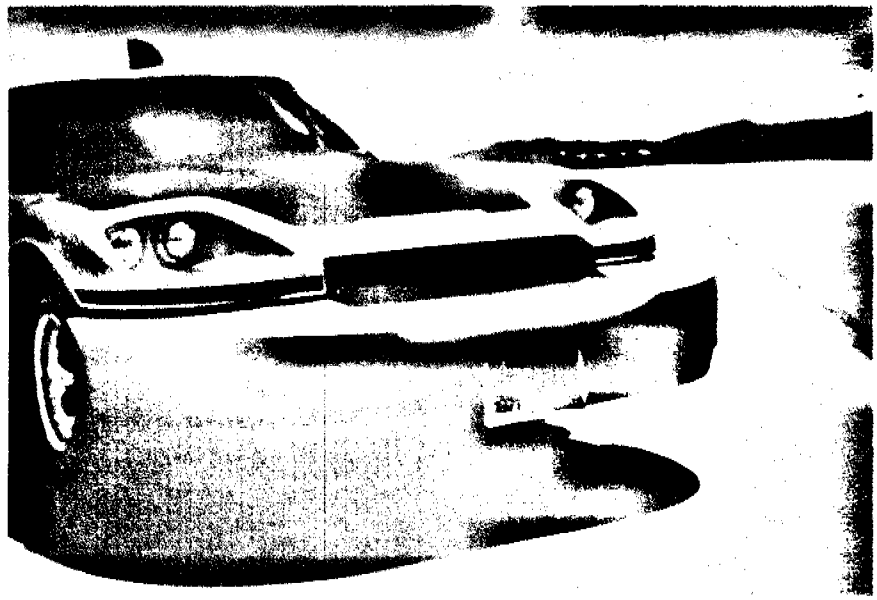
The AMF vehicle encloses passengers in a high strength steel, "space frame," using hydraulic bumper systems, front and rear.

All parts of the frame are welded and consist of main frame elements running the length of the vehicle, perimeter frame elements, A, B, and C posts and pillars, roof rails and cross members, and frame cross members. Door beams are fabricated of aluminum honeycomb covered by aluminum front and rear sheets with high strength steel hinges and pin clevis assemblies. The energy absorption potential of this design stems from the stretching action of the aluminum skins, along with the crush of the honeycomb material. All exterior panels are fiberglass.

Front and rear bumpers are made of high strength, aluminum alloy forgings covered by plastic absorption material and vinyl. Designed as a velocity sensitive system, the front bumper returns to normal position after impact of 10 mph, and strokes 30 inches to absorb the impact of a high speed collision. The rear bumper strokes only 14 inches. The system is designed to protect passengers up to 50 mph.

Additional low speed passenger protection is provided by extensive use of polyurethane foam, sculpted and glued in place in the passenger compartment. The material is 2-3 inches thick on the pillars and 3-4 inches thick on the doors and other areas.

High speed passenger protection is also afforded by an air cushion system; one housed in the steering wheel hub for the driver, the other in the dashboard for the front seat passenger. Rear seat passengers are protected by air cushions deployed from the B pillar cross member.

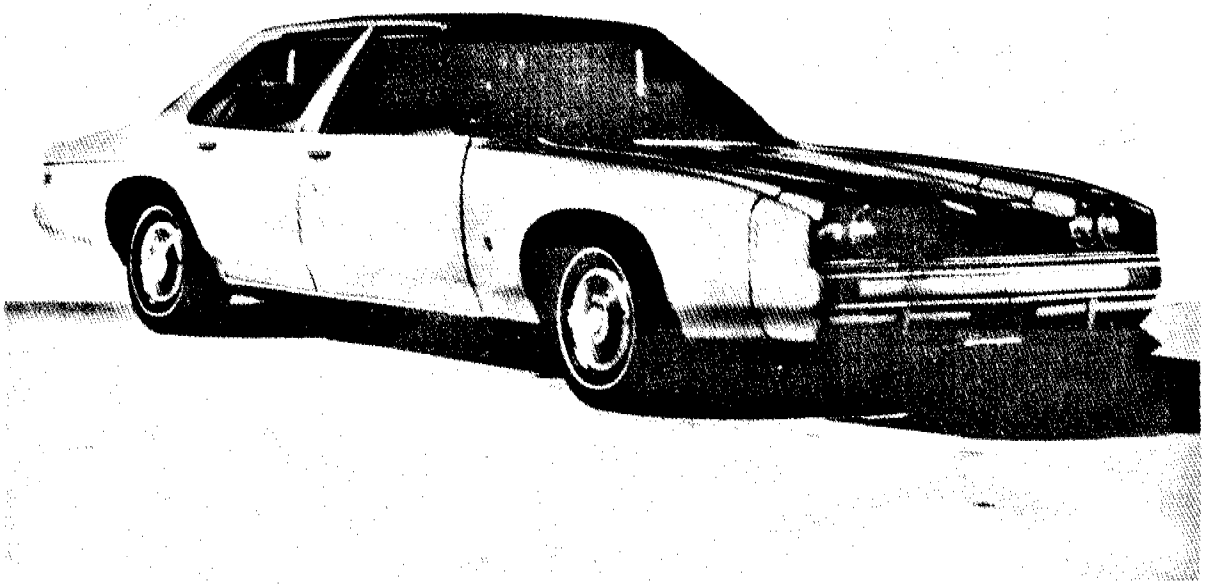



AMF

GM

The United States

GENERAL MOTORS EXPERIMENTAL SAFETY VEHICLE



General Motors' ESV prototype uses a specially engineered bumper and energy absorbing frame to afford maximum occupant protection.

Two thirds of the impact forces are absorbed through the frame, and one third by the front sheet metal and hood, and doors. A front hydraulic bumper absorbs part of the impact, the remaining force by a collapsible truss system, and the balance through the drive train. Aluminum is used for body panels, bumper, and door beams. Vanadium alloy steel is used in the frame body side pillars. The frame design features a full box section with both cross and diagonal bracing to handle corner impacts.

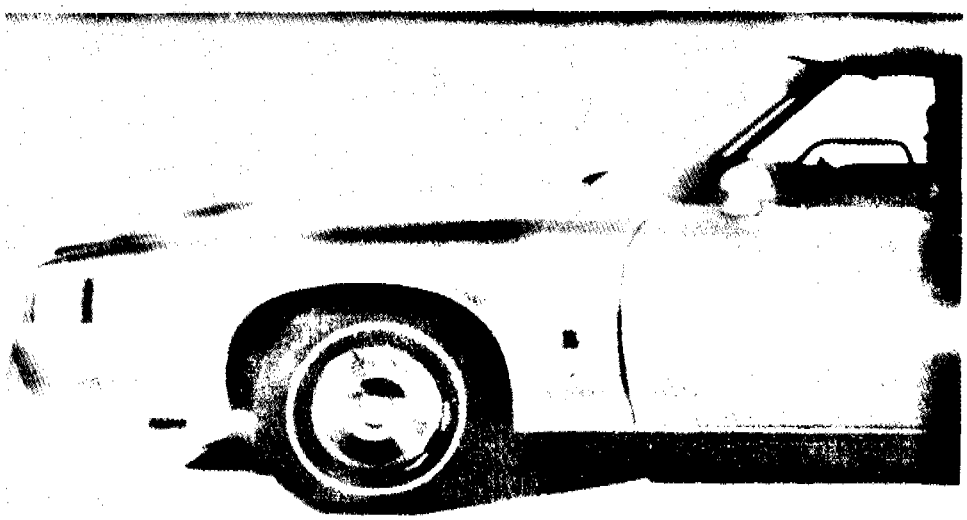
The urethane covered bumpers have a 2.5 inch stroke in a 5 mph barrier impact.

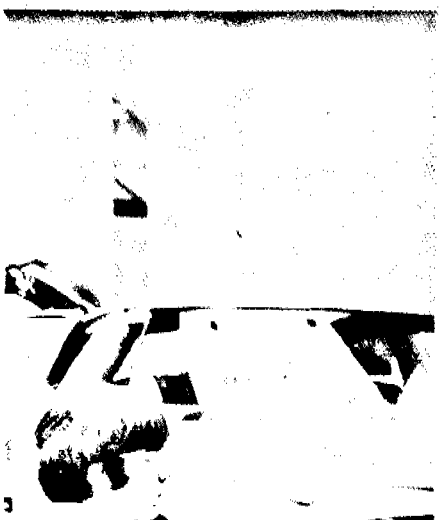
High strength roof supports in the center pillars provide rollover protection, with the forward slope of the pillars reducing the amount of unsupported roof structure over the front seat area.

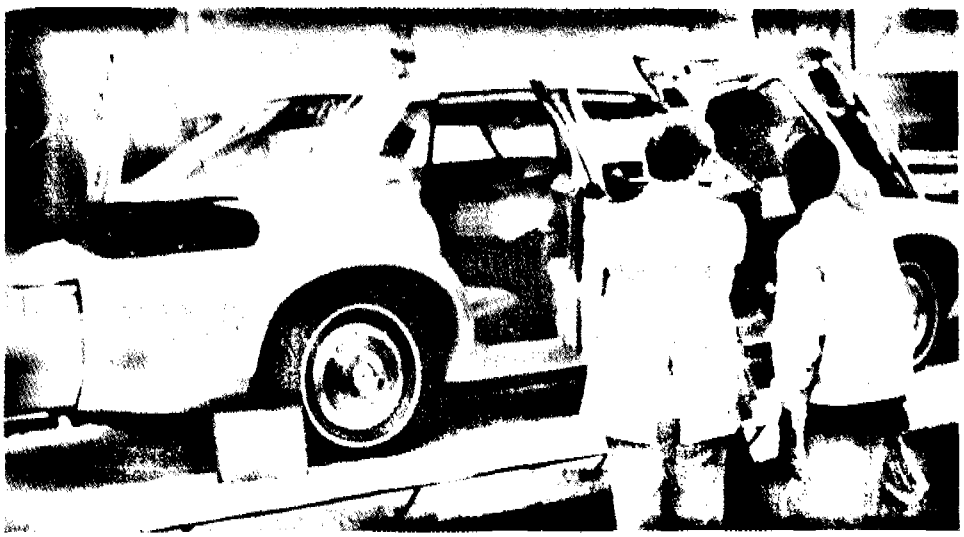
Dual piston disc brakes are used for each wheel, with two separate, dual master cylinders to eliminate a single line failure. The braking system also incorporates load proportioning and wheel lock control devices at each wheel.

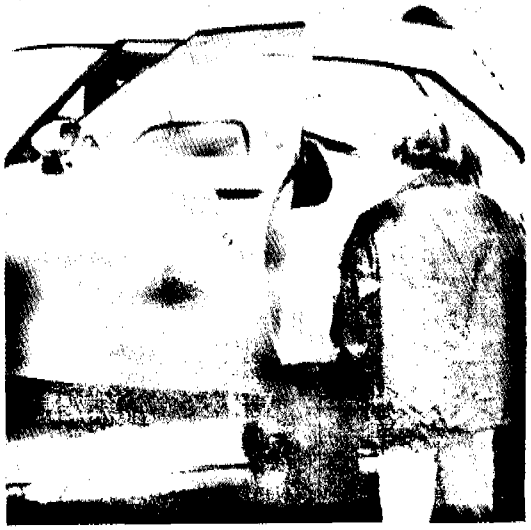
Front and rear suspension systems on the vehicle are of basic production configuration, modified to meet requirements for steering and handling. Coil springs and a roll stabilizer are used in the front system with coil and pneumatic springs, operating in parallel for the rear.

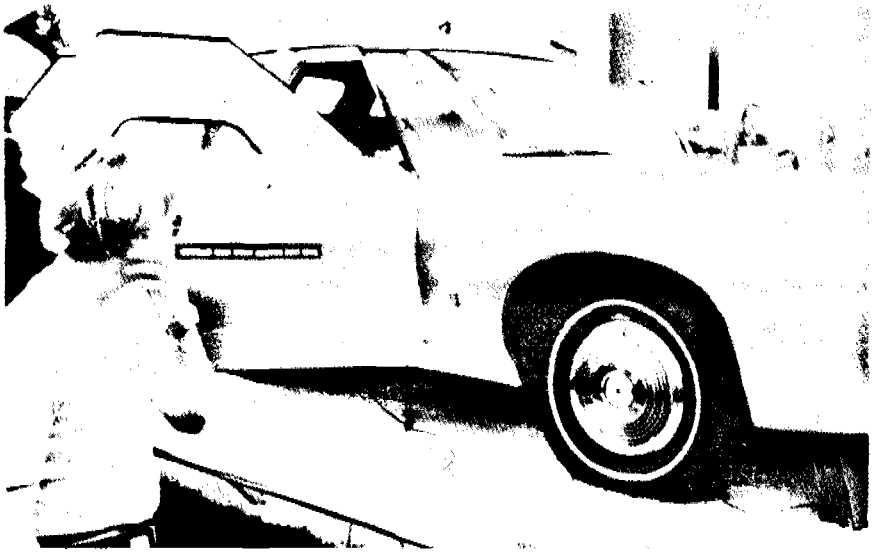
The interior contains sufficient padding to permit the "survival" of unbelted test dummies in barrier impacts of 20 mph. At the same time, the car is equipped with an air cushion system that deploys from the steering wheel for the driver, the instrument panel for front passengers, and a padded "credenza" for rear seat passengers. The air cushion systems are actuated by sensors in the front bumper.







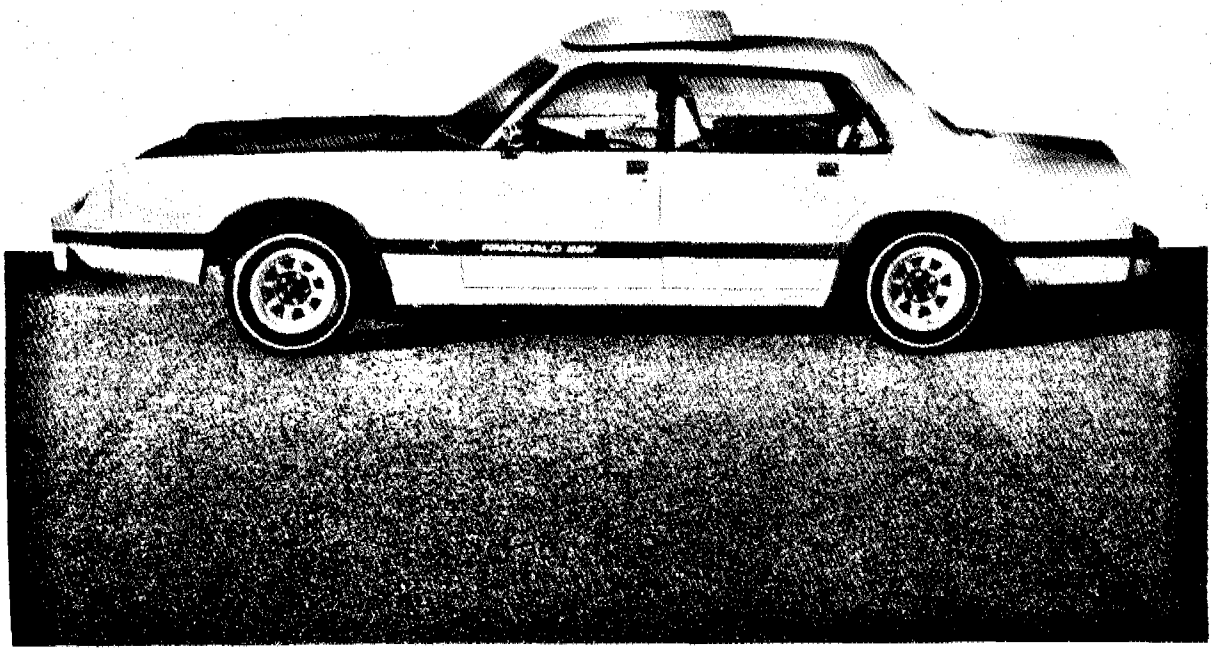




Fairchild

The United States

FAIRCHILD EXPERIMENTAL SAFETY VEHICLE



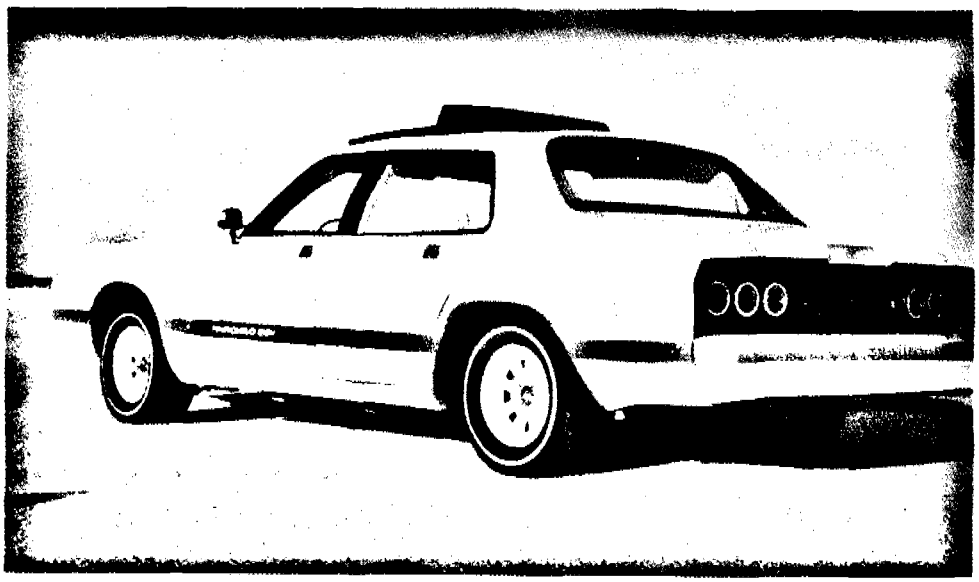
Fairchild's safety car features special bumpers and a roll cage structure to enable it to withstand a range of crash conditions.

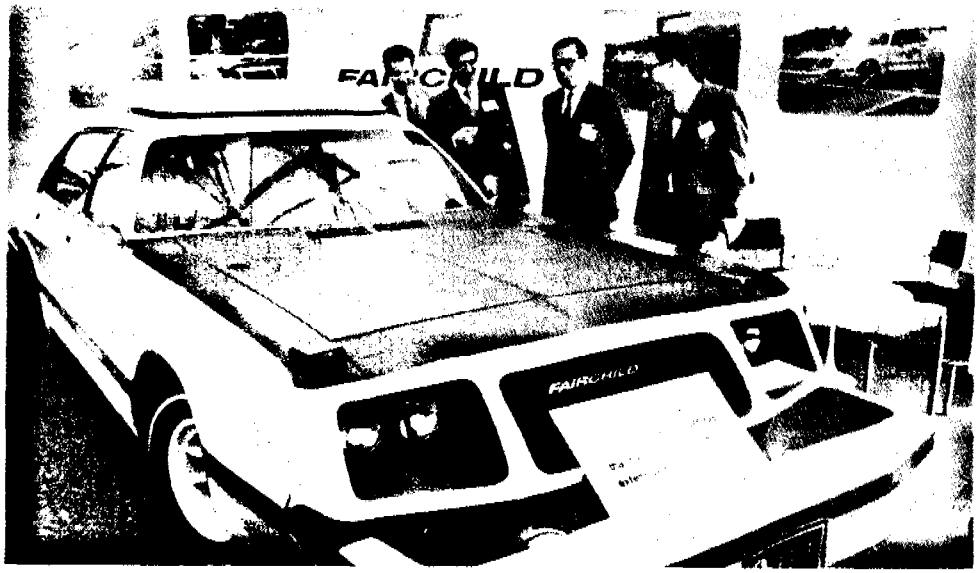
The front bumper automatically extends 12 inches forward at speeds above 30 mph to provide an extra cushioning stroke for high speed impacts. Retracted, the variable orifice hydraulic cylinders which actuate the bumper have a stroke range of 18 inches for low speed impact. Thus, for high speed impact the cylinders have a stroke range of 30 inches. Torsion pins, connecting the bumper with the cylinders, are used to improve performance in angular collisions. The bumper retracts when the transmission is shifted to "reverse" or "park".

The rear bumper is connected to the frame by torsion hinges designed to yield at impacts above the "no damage" level of 10 mph. Below this speed, the force is absorbed by special energy absorbing foam material. Both bumpers are steel core, covered by plastic foam and vinyl.

High strength steels are used in the frame and conventional sheet metal for the outside. Stainless steel and a combination of metallic honeycomb structure is used in the doors and lower sills to provide side collision protection for either car or pole type impact. Rollover protection is provided by roll bars, which are directly integrated with the B and C pillars, and a steel radiator bulkhead.

The driver and passengers are protected by air cushions and extensive use of padding and other energy absorbing materials. Air cushions deploy from a deep dish steering wheel, for the driver, from the dashboard for the front seat passenger, and from a vented roof compartment for rear seat passengers.

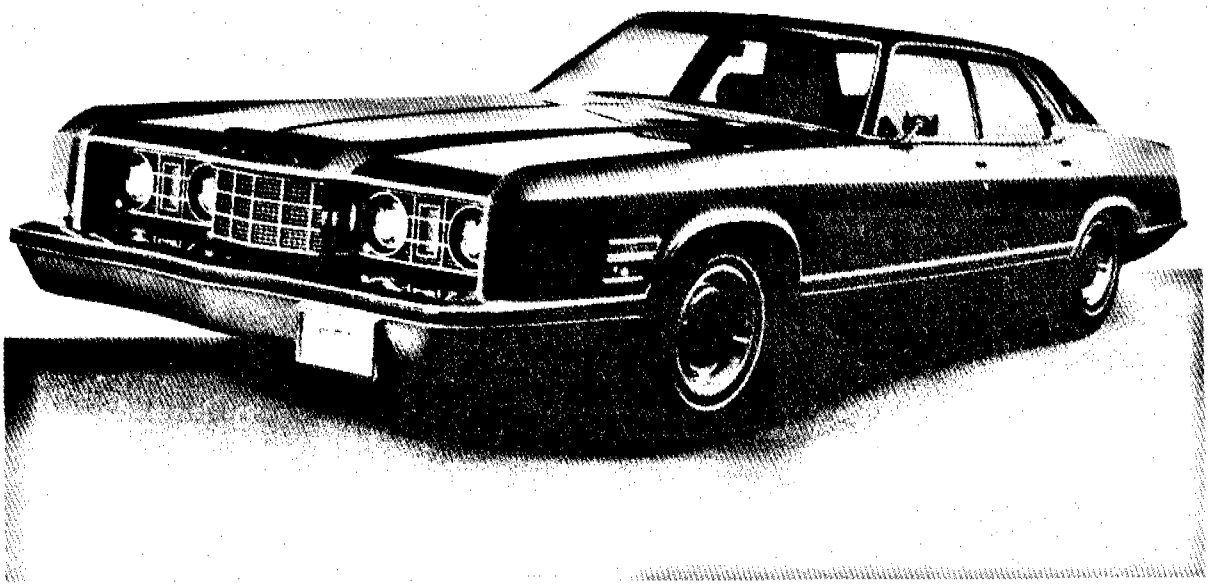



FAIRCHILD
FAIRCHILD

Ford

The United States

FORD EXPERIMENTAL SAFETY VEHICLE



The Ford Motor Company uses a modified standard production model which includes an energy-absorbing frame, impact-absorbing bumpers, and a reinforced body.

The frame is designed to absorb 65 percent of the energy generated in a 50 mph frontal barrier crash. It uses four convoluted steel sections to soak up energy as they compress in response to impact forces.

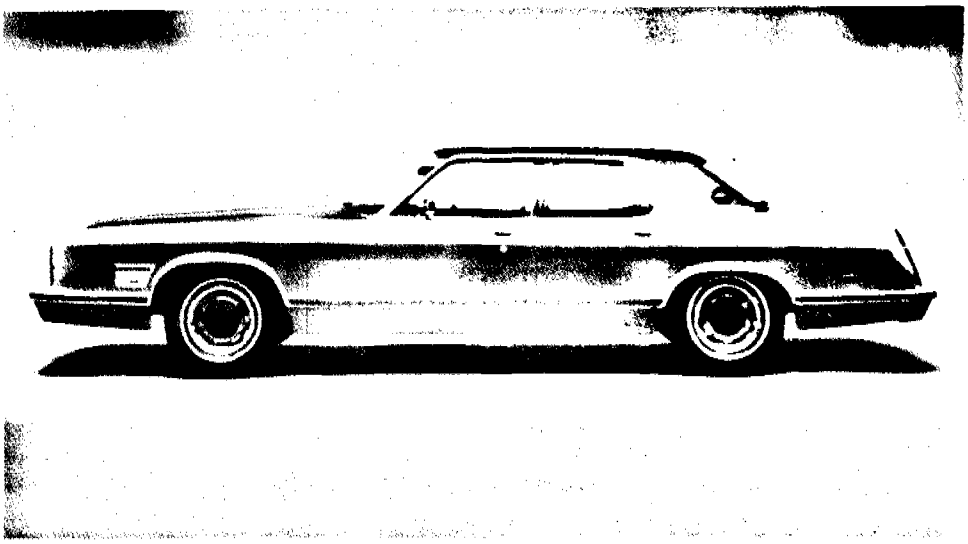
The body front end, incorporates a "controlled-collapse apron," which is located over the front wheels, ahead of the engine compartment. This is designed to absorb the remaining 35 percent of crash energy.

The front bumper is made of a special high-strength alloy to absorb a 50 mph pole impact. The front bumper extends further than a conventional bumper to allow room for a 9-inch stroke of the hydraulic struts which secure the bumper to the frame. Both the front and rear bumpers have a special "cosmetic" covering which, with the hydraulic struts, should enable the bumpers to meet 10 mph "no-damage" objectives.

The vehicle has reinforced side pillars, roof panels, door guard rails, and two unique beams which cross the car immediately behind the fixed front seat – one at floor level and one about half-way between the floor and the roof.

Additional passenger protection is provided by a structural tunnel, running between the two front seats. The transmission shift lever and other controls are located in a console mounted on the tunnel in order to provide space in the instrument panel for restraint devices and associated hardware.

The car is fitted with passive occupant restraints. These systems use three different air cushion designs. For the driver, there is one unit in the hub of the steering wheel and a second in the instrument cluster. These are augmented by a collapsible steering column and knee panels. For the front passenger, there is a single system. A large, common air cushion system is mounted on the back of the front seat for those riding in the rear.



Triumph

The United Kingdom

TRIUMPH EXPERIMENTAL SAFETY VEHICLE

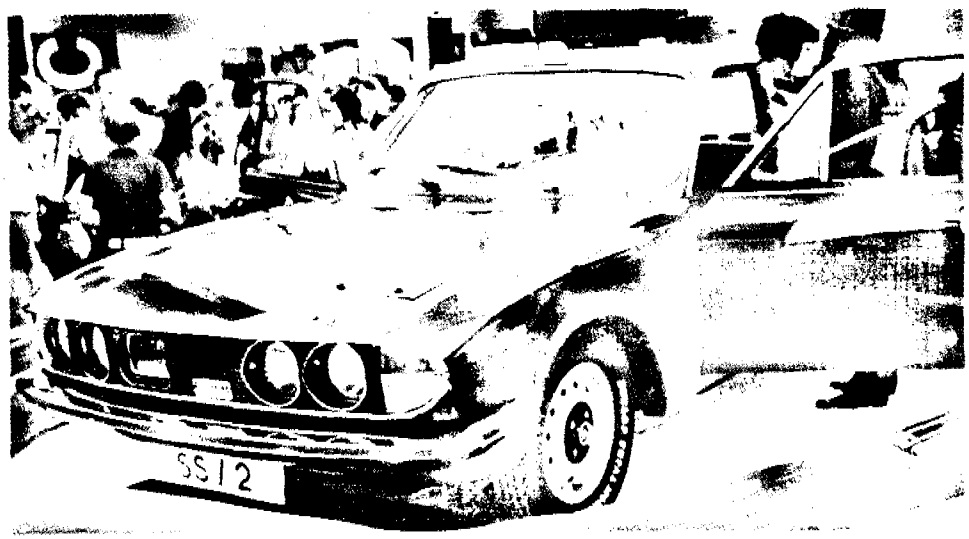
The Triumph SSV 2 reflects safety ideas consistent with European thinking and future legislation on vehicle and passenger safety.

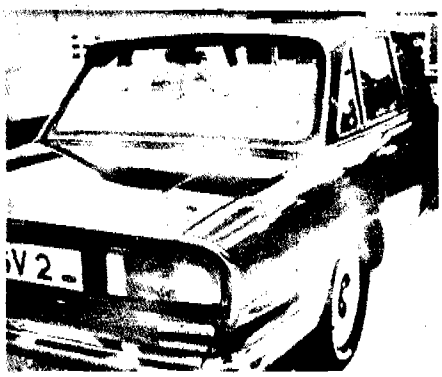
The Triumph uses the Girling-Lucas protection system, which eliminates wheel locking and skidding, with no loss of steering control and overall stopping distance.

Self-leveling headlights counteract misaim and increase of glare. A headlight cleaning system maintains lighting efficiency and the "Autosensa" device projects a high intensity beam to augment normal dimmed headlight beams. An automatic mirror deflects the dazzling reflections of following cars.

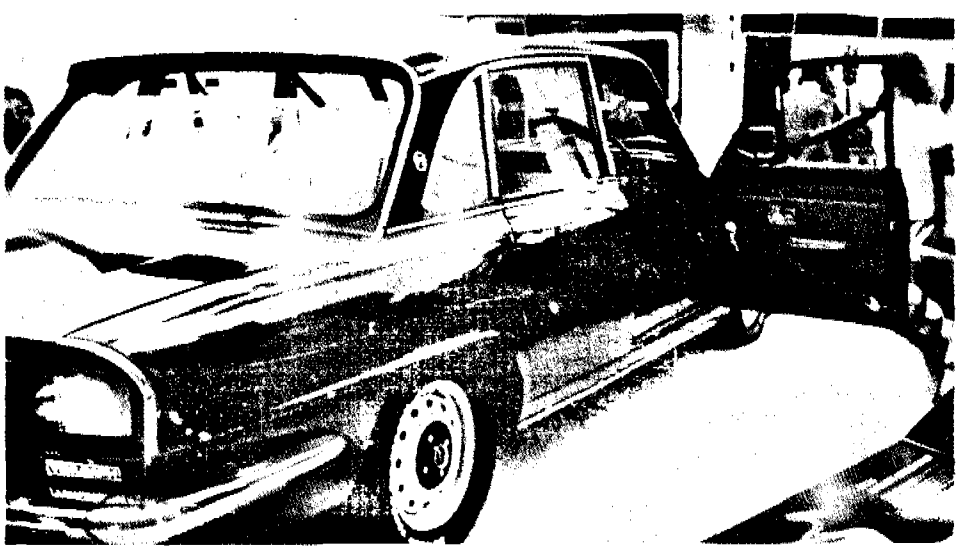
A vehicle monitoring system is used to display malfunctioning of the vehicle. Conditions monitored by this system include brake alert, oil pressure, bulb failure, brake pads, brake fluid, oil and windshield washer levels.

A radar system is undergoing research to maintain safe distance between vehicles on expressways.


SS12



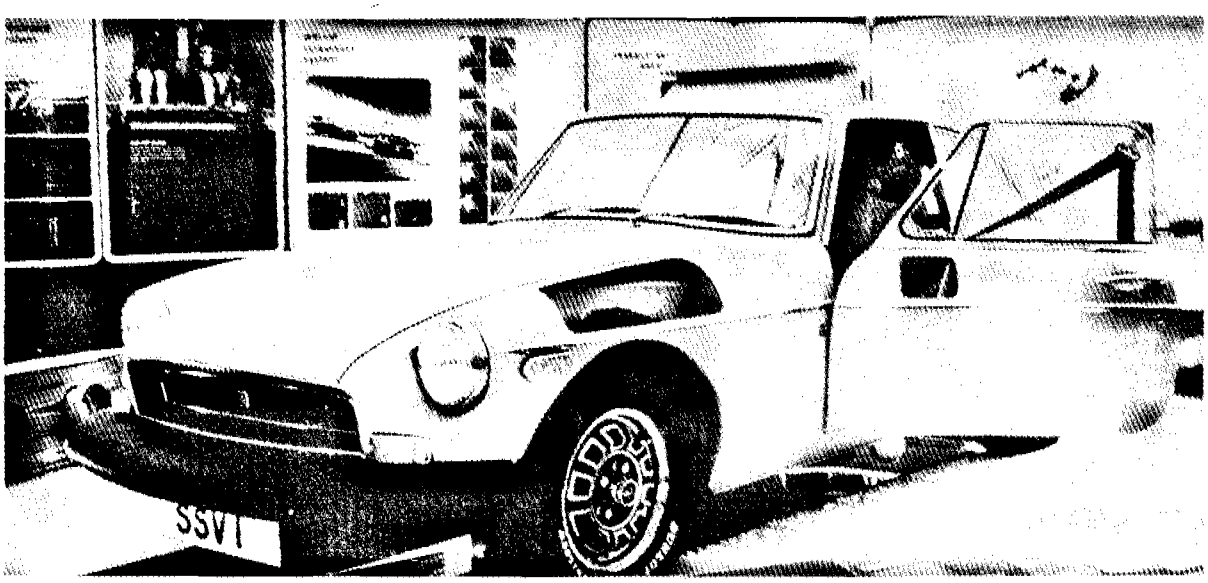

SSV



MG

The United Kingdom

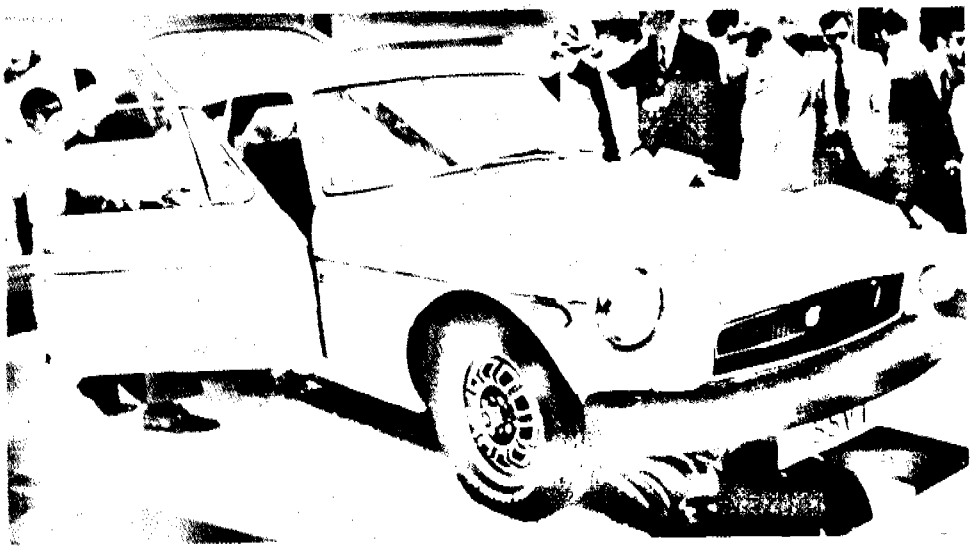
MG EXPERIMENTAL SAFETY VEHICLE

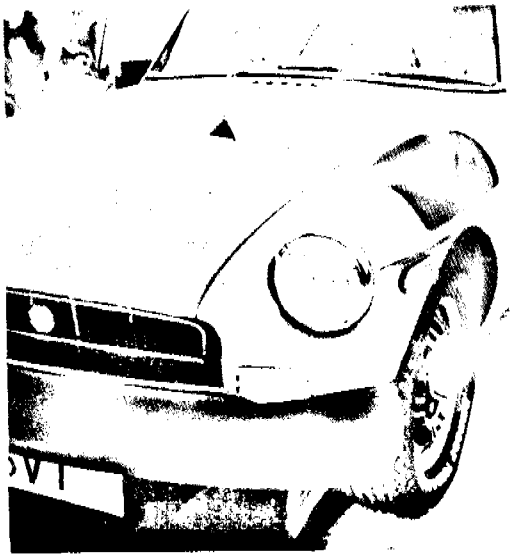


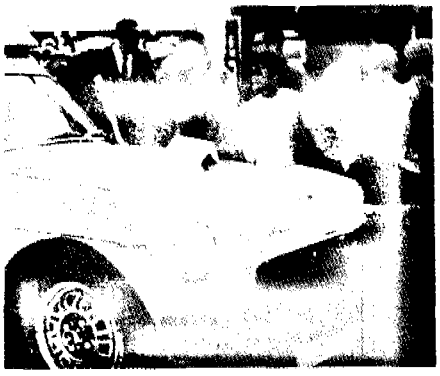
The MGB/GT SSV I is a modified production model featuring restraint and safety protection devices and active ride control and anti-lock brakes. Side strength is increased by internal door guard rails, and by filling hollow box members with structurally rigid polyurethane foam to inhibit collapse. The bumper has a strong steel main member built up into a padded section with a stiff foam "nose" covered with a tough outer skin to distribute the load on impact. A new hydraulic anti-roll suspension provides constant ride height and eliminates roll and pitching.

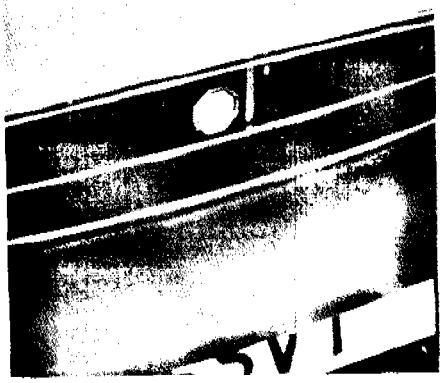
A full passive restraint air bag system is actuated by a sensor on the front bulkhead, and an alcohol screening tester is used to reduce the problem of the intoxicated driver. A periscopic system uses there plane mirrors for over-the-roof wide angle rear viewing.

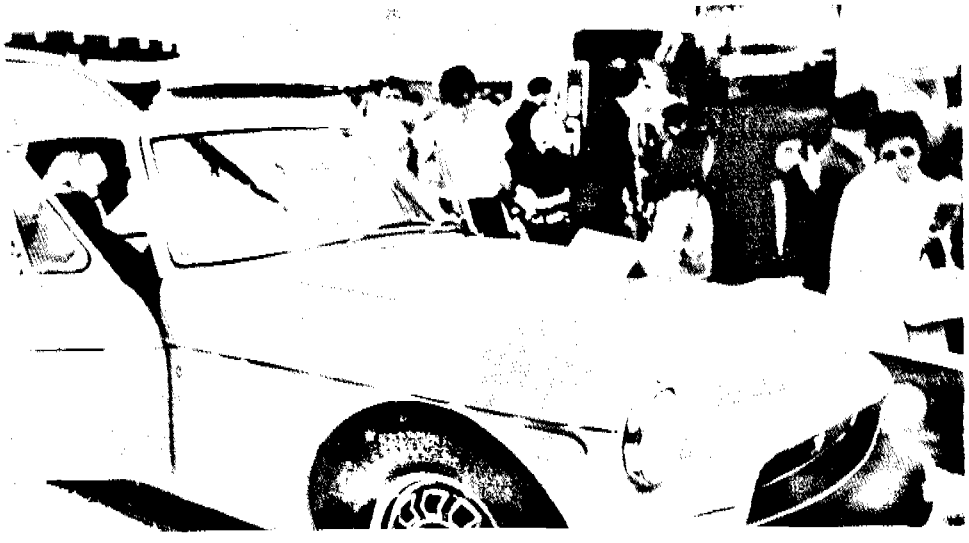
A speed and distance warning system provides a means of maintaining adequate spacing between vehicles. Two vertical lines are projected on the windshield in the driver's line of vision. The spacing of the lines is proportional to speed and approximates the width of the car in front for safe following distance. An anti-lock system to prevent skidding is incorporated into hydraulically pumped accumulators for fail-proof brakes.







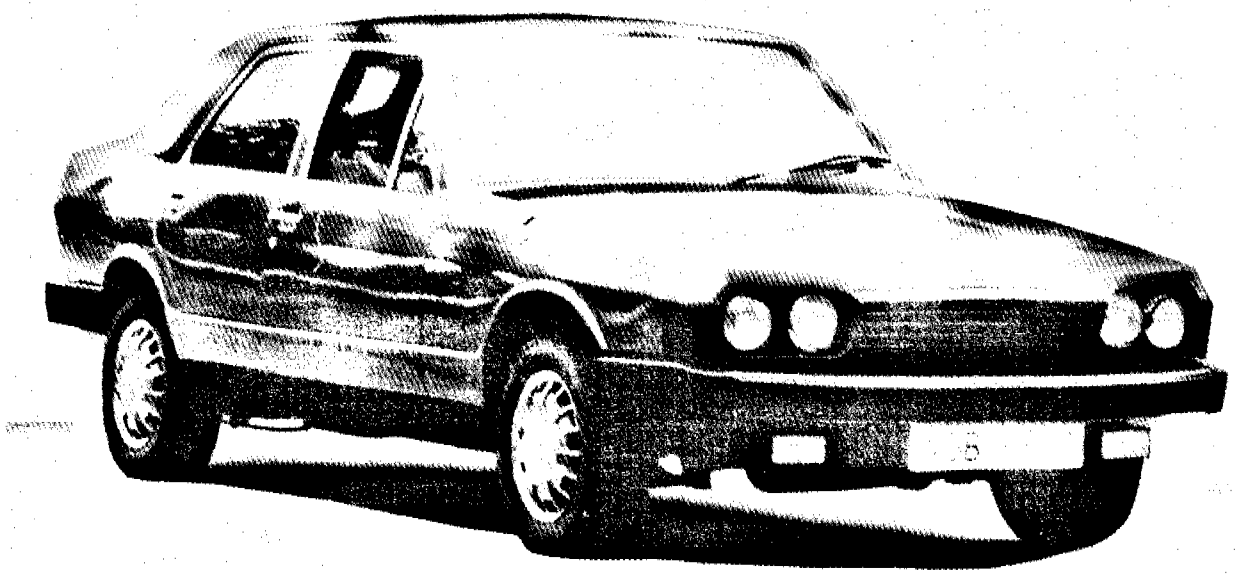




Volkswagen

Federal Republic of Germany

VOLKSWAGEN EXPERIMENTAL SAFETY VEHICLE



Volkswagen's ESVW utilizes a combination of rigid perimeter "tough shell" construction backed by crumple zones that deform and absorb crash energy at known rates.

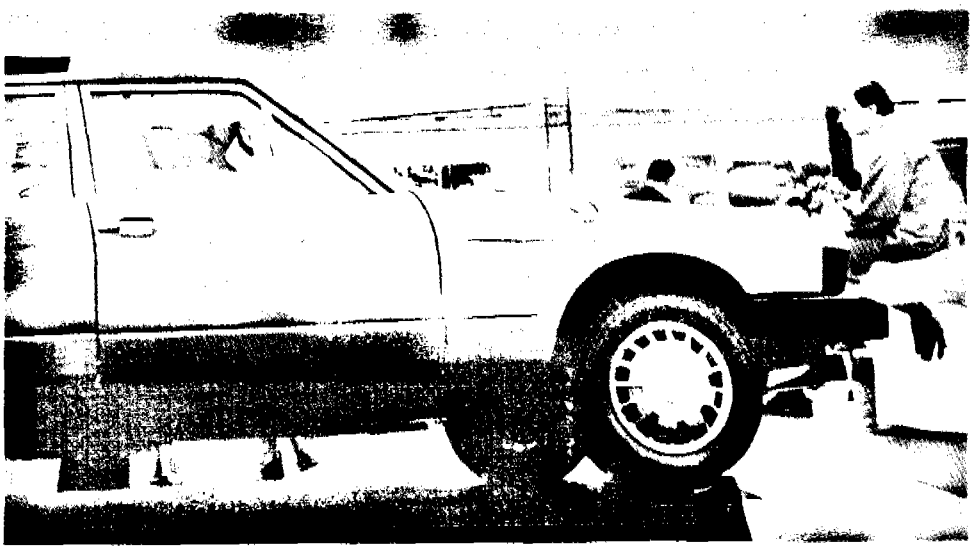
In low speed collisions from the front or rear, telescoping hydraulic bumpers absorb impact and return to normal shape and position with no damage. At higher speeds, after the initial impact absorption takes place in the bumper cylinders, a back-up hydraulic system takes over until at high speeds the sheet metal itself becomes the energy absorbing medium. The front bumper has a total telescope stroke of eight inches, while the rear bumper has a five-inch stroke and absorbs a 5 mph impact without damage.

The ESVW does not use air bags. Instead it is equipped with a passive, pre-loaded, energy-absorbing restraint system utilizing a shoulder belt and a knee belt.

An across-the-chest belt hands loosely in front of the occupant in normal driving and there is no knee restriction. In a low-speed collision, the occupant is restrained by the loose belt and a padded knee bar. At speeds over 15 mph, as the front bumper telescopes inward at the moment of impact, a sensor located inside the bumper sets off a charge within a closed cylinder. Gas expansion activates a device which tightens the belt across the occupant's chest and deploys the lower belt that grips his knees.

Force limiters in the shoulder and knee belts are designed to "give" at a predetermined load so the wearer can "ride out" the collision inside the rigid passenger compartment. The belts avoid problems that air bags present such as potential for inadvertent firing, and no protection at speeds below their triggering level.

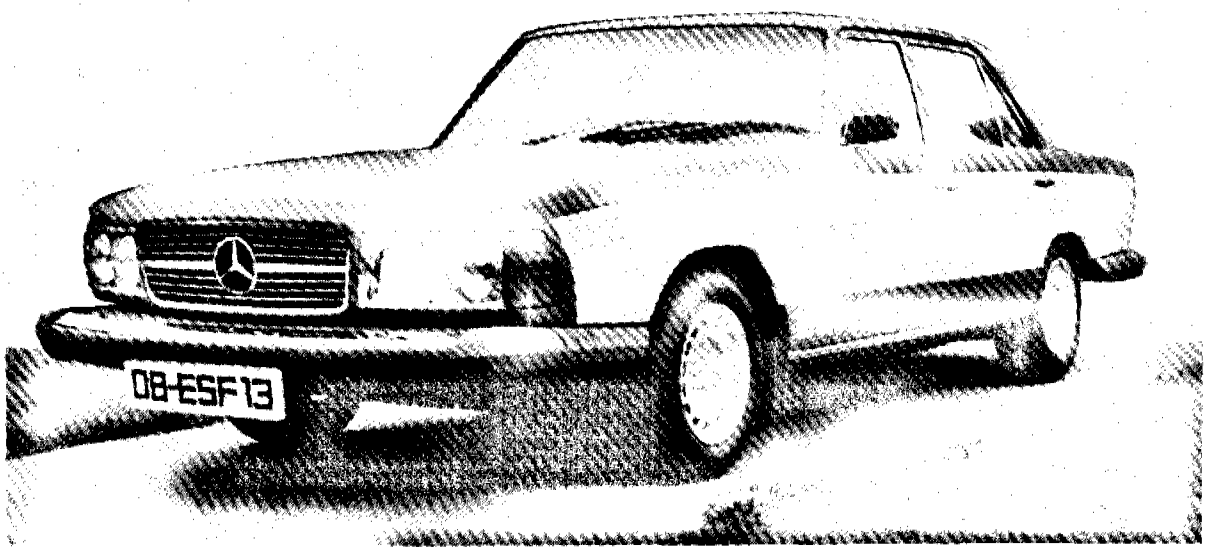
The front seats are unitized with the floor structure, the central "backbone", and the strong transverse bulkhead. Seat backs are designed to absorb energy in rear-end collisions.



Mercedes-Benz

Federal Republic of Germany

MERCEDES-BENZ EXPERIMENTA
SAFETY VEHICLE

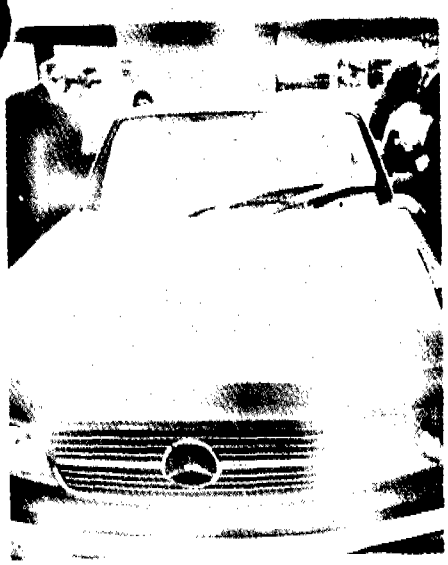


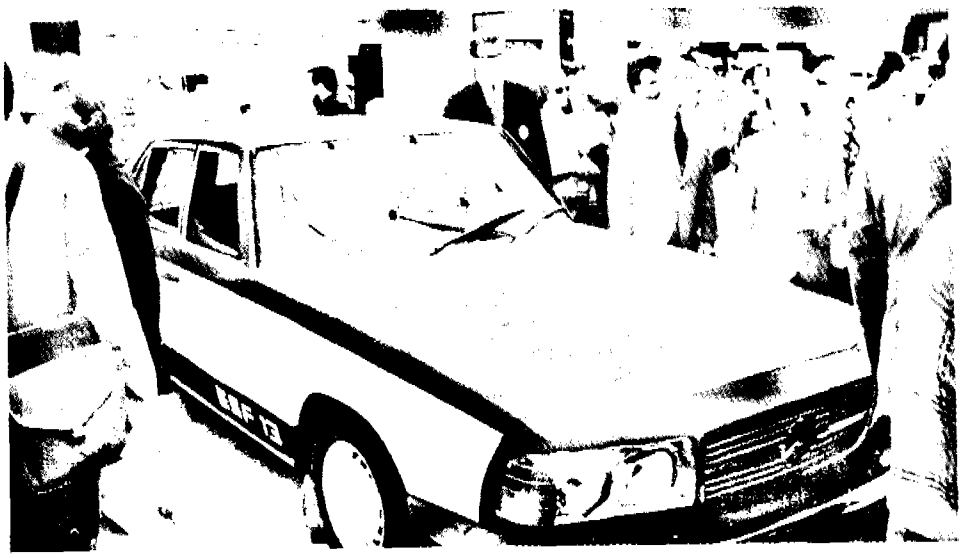
The Mercedes-Benz ESV 13 has been developed from the company's basic 250 model using regenerating shock absorber bumpers and passive and active passenger restraint systems. Three-point safety belts are used for all passengers, with dual sensitive emergency locking retractors for the three rear seat passengers. Air bags are provided for all passengers.

The ESV 13 is a five-passenger sedan with a weight of approximately 4,620 pounds and a wheelbase of 112.2 inches, or the same as the standard 280 SEL Model.

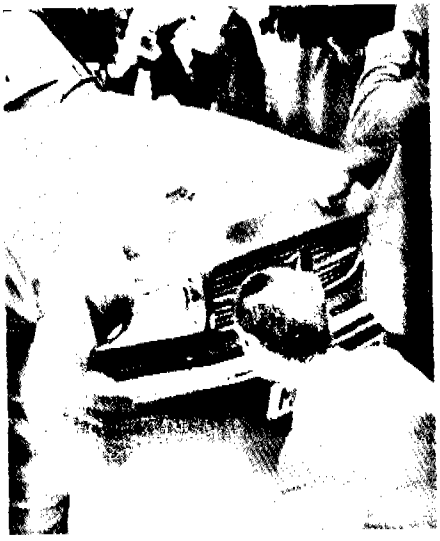
The most notable feature which is not required by the ESV performance specification is the ABS system, an anti-lock braking device that enables the vehicle to be stopped in the shortest possible distance regardless of the type of road surface and regardless of whether the surface is wet or dry.

Other unusual features are a rear seat head restraining net, a wiper for the rear window, corrugated tail lights that stay bright by resisting dirt build-up, washers and wipers for headlights, and attractive styling.




KF 13


EDES·BENZ

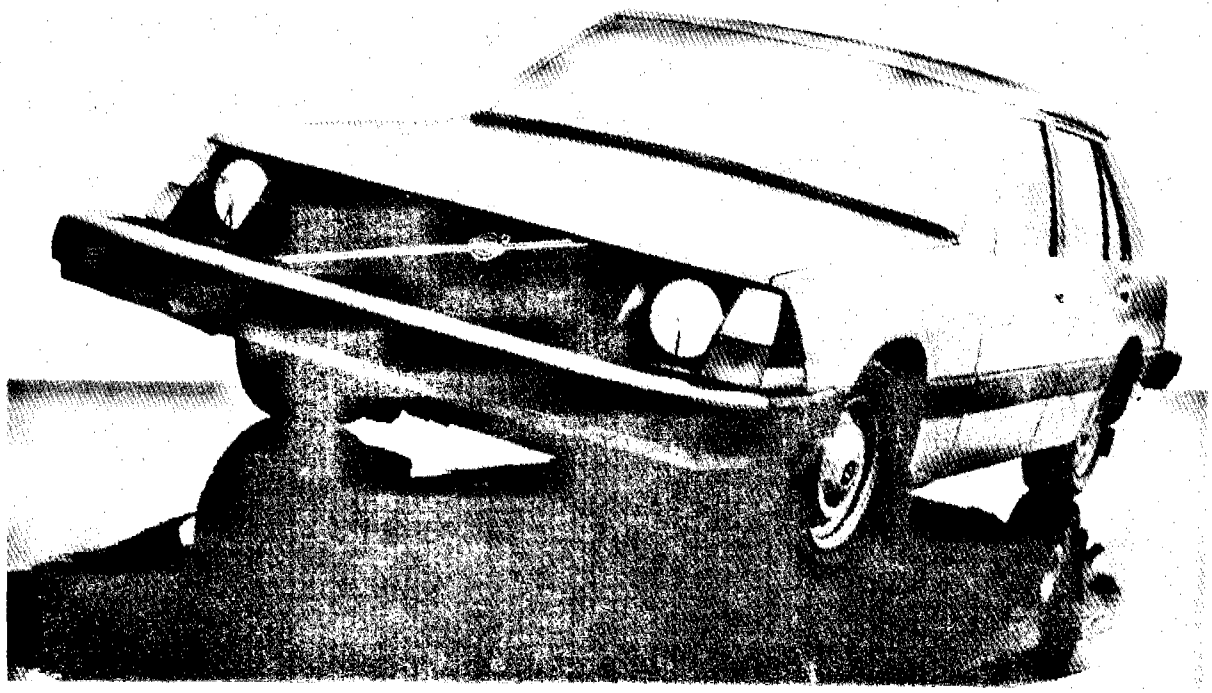



FBF 13

Volvo

Sweden

VOLVO EXPERIMENTAL SAFETY VEHICLE

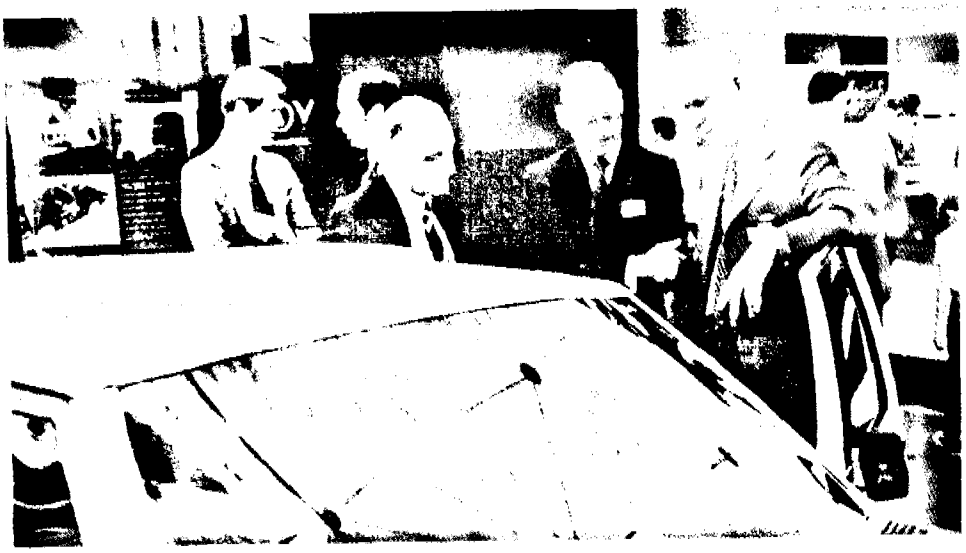


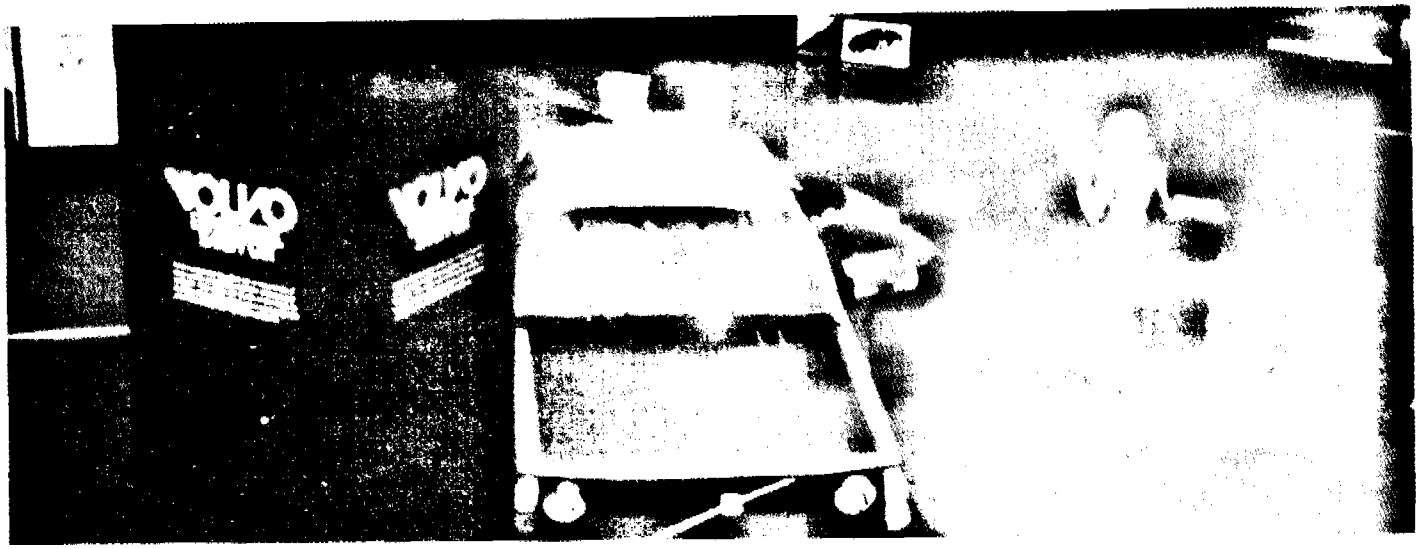
The Volvo ESV uses a system of high-strength steel members to protect the car's body. A rollover bar crosses the roof and tubular steel reinforcements run along the body inside the doors. Special hooked-units lock securely onto door posts to minimize side impact effects and to reduce intrusion into the passenger compartment by another vehicle. On impact in frontal collisions the engine is forced under the car, avoiding the extreme hazard of engine block intrusion into the passenger compartment.

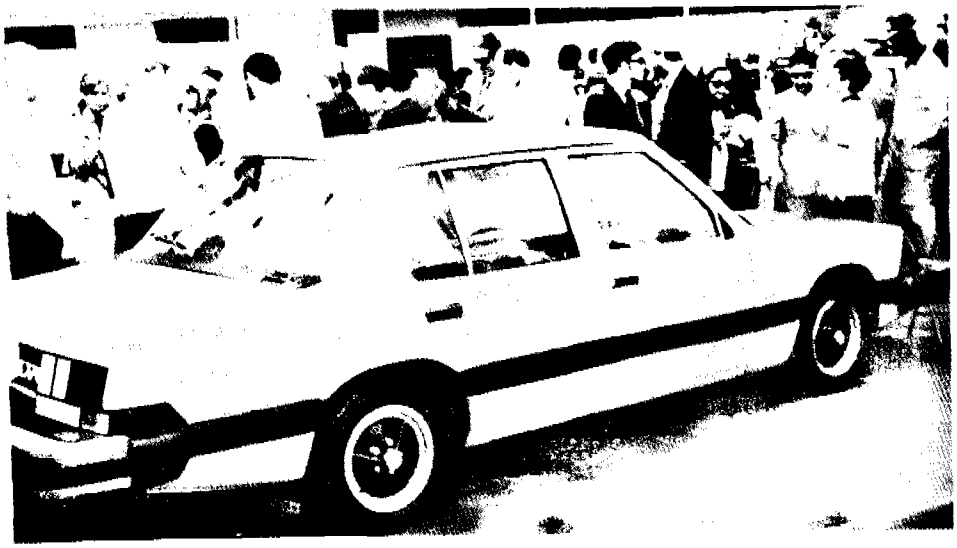
At speeds up to 10 mph against a fixed barrier, the protruding front bumper flexes seven inches to absorb impact and protect the car body from damage. The rear bumper flexes three-and-one-half inches against a movable barrier at the same speed.

The front seat is equipped with semi-passive safety belts which come into operation automatically when the car is started and the handbrake released. A spring-loaded steering wheel lessens the chance of driver injury by pulling away in a frontal collision. Activated on impact by a deceleration sensor, the spring pulls the steering wheel forward six inches.

Air bags are included for all occupants, including those on the rear window shelf to protect back seat passengers in rear end collisions. Front seat head restraints are built into thickly-padded seat back rests. In a collision, they pop up automatically to provide added protection.



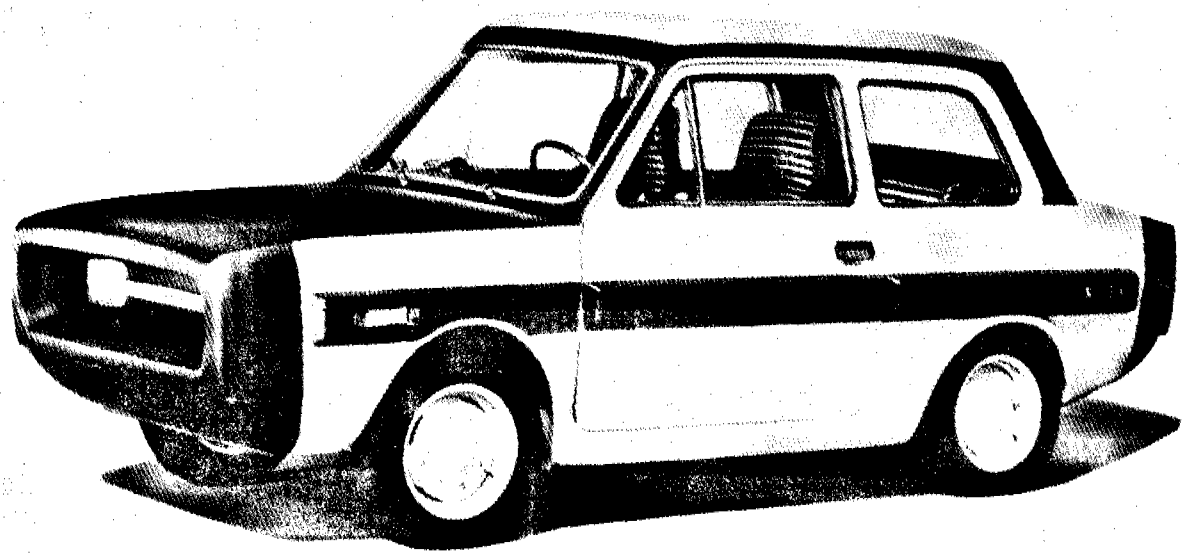




Fiat

Italy

FIAT EXPERIMENTAL SAFETY VEHICLE



The Fiat prototype gave priority to project design and development of an experimental safety car in the lighter weight class. This was partly on account of the irreplaceable role of this type of vehicle in popular motoring, and partly because the safety standards proposed for this class are likely to weigh particularly heavily on the cost/profit ratio.

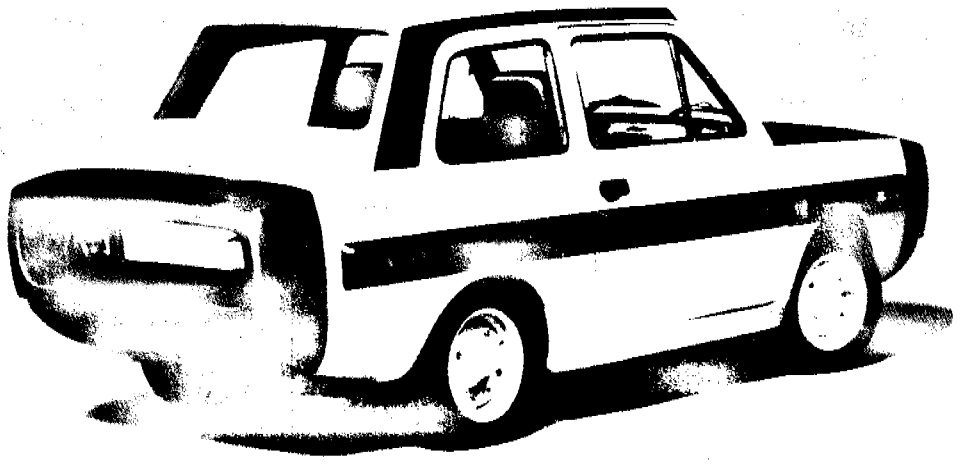
The prototype was developed after a preliminary cycle of project designs and tests aimed at improving the crashworthiness of the 500 sedan, the smallest current Fiat production car.

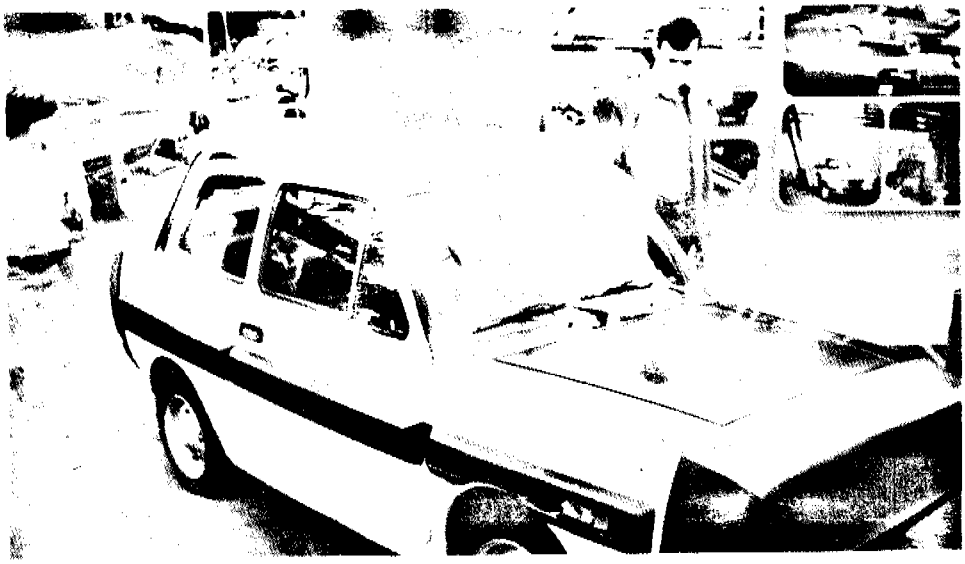
The car body end sections, of identical shape, consist of two easily removable deformable elements secured to the body work metal structure. These elements in addition to providing protection during front and rear collisions also reduce car aggressiveness, particularly in the event of striking a pedestrian.

The elements of the body structure reflect unique design solutions to the problem of collisions with heavier weight cars.

Fiat is testing two different self-regenerating bumper systems; one uses bladders filled with elastically compressible synthetic foam, and in the other, the outer sheath of the bumper is filled with synthetic foam endowed with particular elasticity and hysteresis characteristics.

Weight increases over current production 500's is estimated at 46% with a cost increase of approximately 40%.

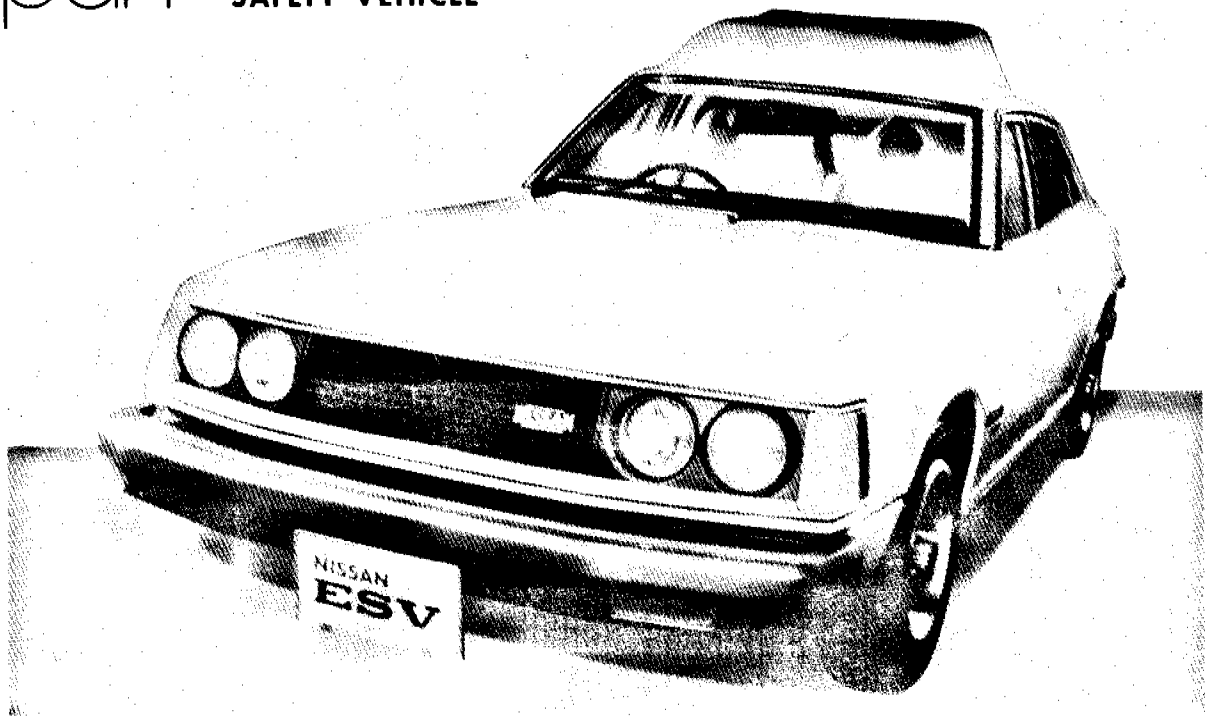




Datsun

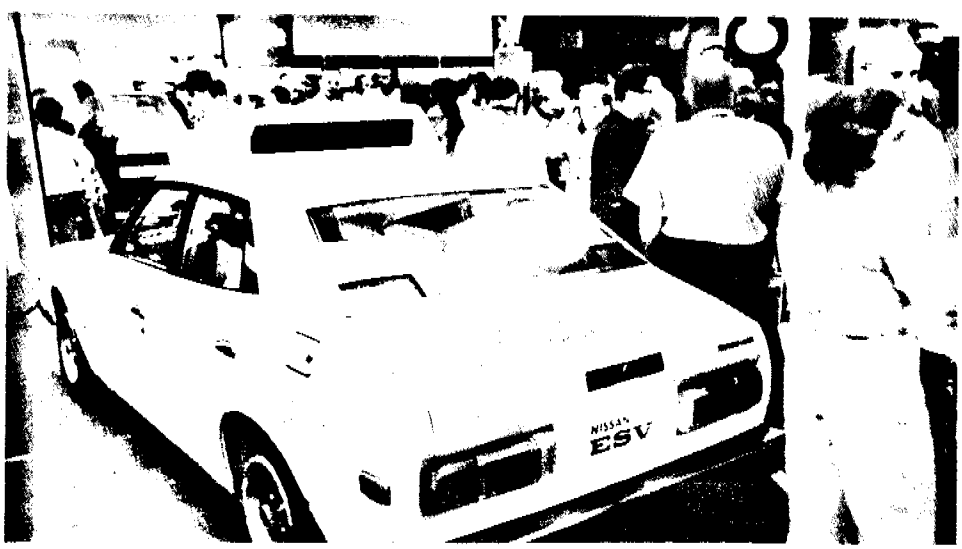
Japan

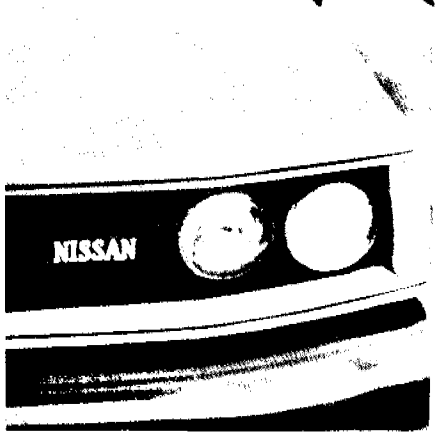
DATSUN (NISSAN) EXPERIMENTAL SAFETY VEHICLE



The Nissan Motor Company's ESV is a modified production model of the Datsun 510 sedan designed to insure the occupant's safety in a 50 mph barrier crash.

Some of the more significant safety-performance features of the Nissan ESV are a body structure with a combination of rigid passenger compartment and energy absorbing front and rear ends; explosive-type airbags (with a radar sensor now under consideration) and thick padding to protect occupants; safety bumpers to withstand damage in minor collisions up to nine mph as well as non-inflammable interior materials; a roof-top periscope providing three times as much rearward vision as the conventional mirror.

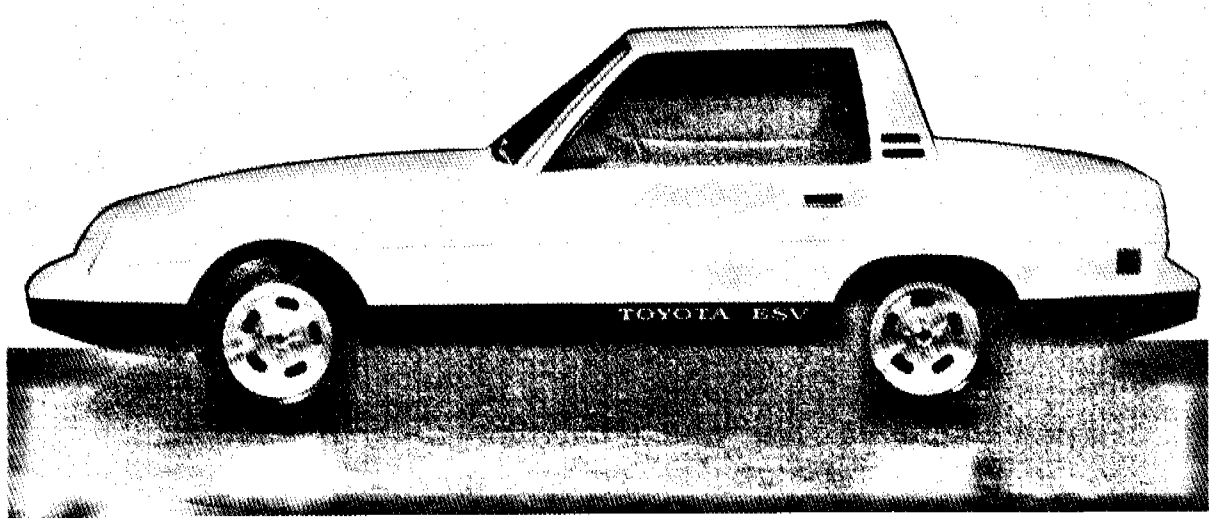

NISSAN
ESV


NISSAN

Toyota

Japan

TOYOTA EXPERIMENTAL SAFETY VEHICLE



Toyota Motor Company's experimental safety vehicle features an impact absorbing frame and fire wall, an engine that falls away from the vehicle upon impact, self-inflating protective cushions, reinforced side and roof, automatic skid control, and increased visibility for occupants.

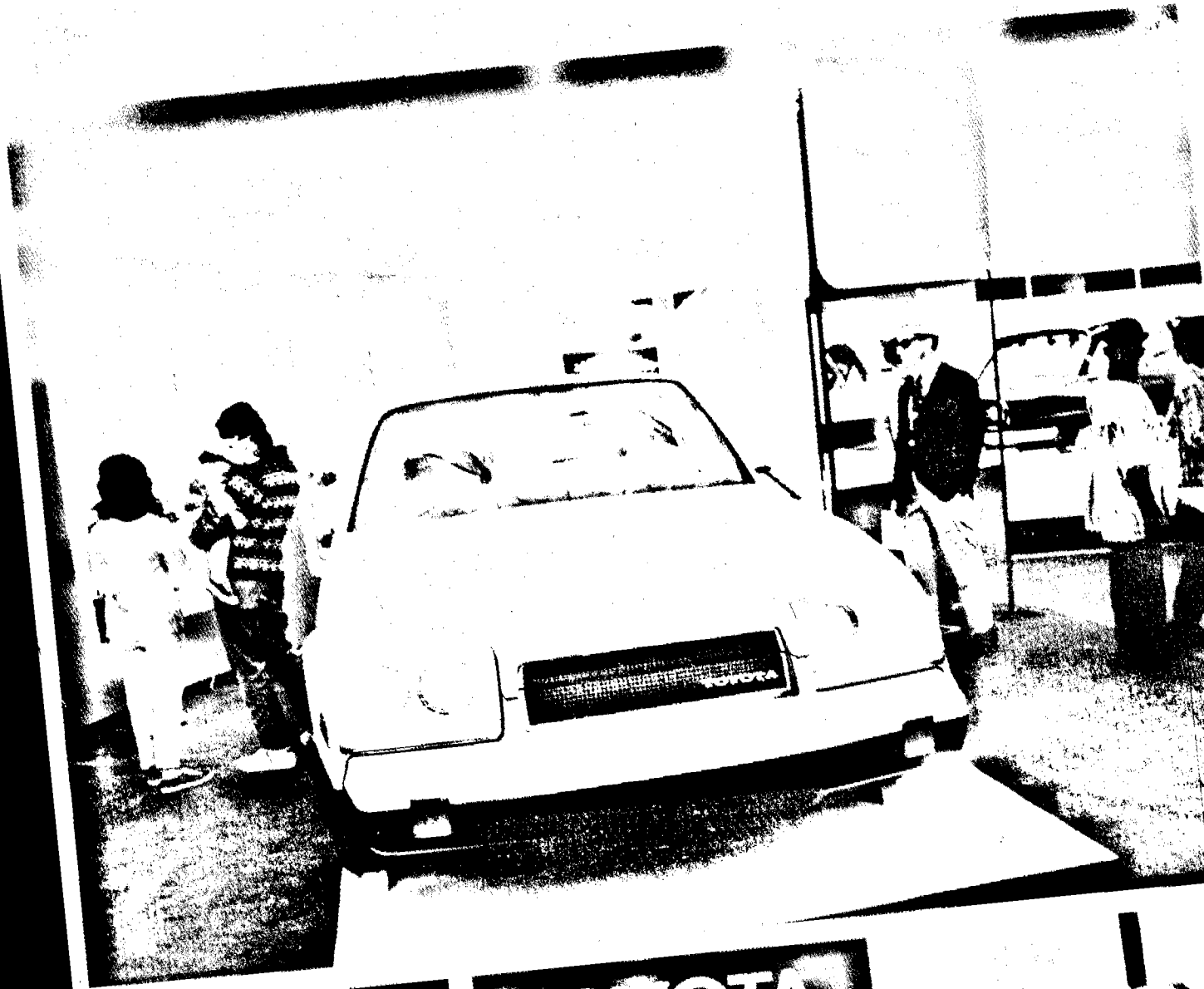
A two-seater car, it is claimed capable of protecting occupants in head-on crashes up to 50 mph and roll-over accidents up to 60 mph.

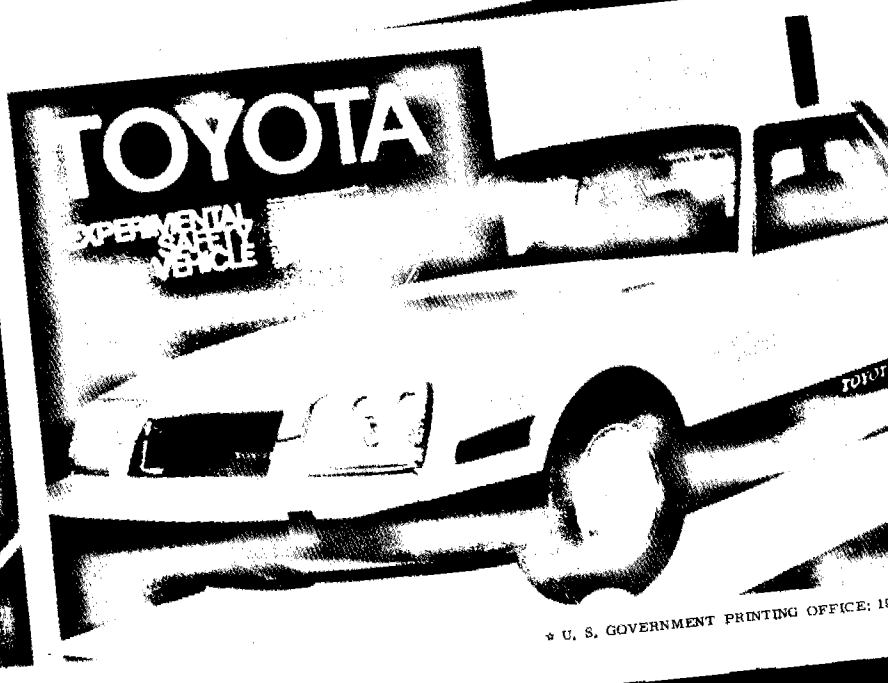
Toyoto uses a computerized gas bag system that inflates a split second before impact. Microwaves, emitted by a sensor in the front of the vehicle, are reflected off approaching objects. The reflections are received by electronic circuits, which determine the speed and distance of the object and trigger gas bag inflation before collision.

Special structures that reinforce side strength give the ESV great resistance against dangerous lateral impact from other vehicles or fixed objects. The top is also built to withstand the impact of rolling.

Toyota's ESV features impact-tolerant front and rear body construction, a bumper that keeps the car free of damage in collisions up to 9.3 mph, thick interior padding, lap and shoulder belts, and a shock-absorbing steering column.

For future models, Toyota designers are working on a special instrument that automatically checks crucial items before the car starts. To insure the car is roadworthy, a computer will check such items as brakes, oil pressure and headlights and indicate their condition by flashing either a green (o.k.), yellow (take action), or red light (immediate repair or adjustment required).





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